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THE COST OF DOING BUSINESS.

Before we can declare a dividend, we must know the cost of doing business. Cost first, profit afterwards. Men are divided into two classes in business matters—those who are concerned about the **high cost of living**, and those who are agitated about the **increased cost of high living**. The latter belong to the "silk-stocking" brigade, the "plutocrats," "the 400," and all the other names which have been applied to them. We are not of that class. We are vitally interested in the high cost of living, and the high cost of living is directly dependent upon the cost of doing business. Now you can understand why the cost of doing business is attracting so much attention at the present time.

Think of it! There are less than 500 plumbers in the United States who are rated at from $10,000 to $20,000! Five hundred plumbers out of 22,000! For the various directories and lists give 22,000 names of master plumbers, so-called, self-called, or actual.

At every convention this year, this question of cost has been of supreme interest. In every case an accusing finger has been pointed at "overhead expenses." It seems to be clearly established that **overhead expense is a reality, is operative all the time,** and the plumber and steam-fitter who has not allowed a space in his books for the recording of this overhead expense must class himself either as an imbecile or a lunatic. For an expenditure of $1 a first-class book on business matters can be secured, which will itemize every element in overhead expenses. The book secured, there remains to be spent but time and effort to understand and appropriate the knowledge it contains. Notwithstanding the cheapness of the information, or the ease with which it can be secured, still nearly 50 per cent of the plumbers and steam-fitters of the country are content to lose thousands of dollars because they are too lazy or too apathetic to spend 100 cents. The words "imbecile" and "lunatic" are really too mild to apply to those who are content to remain so ignorant.

There is one mitigating feature, however, in these

cases, and that is that the majority of them have not yet been reached by the gospel of business management. The message has not been preached effectively, and the greater part of the blame for the ignorance of others lies on our own shoulders. You who are reading these lines, you say you know all about these overhead expenses, and you understand thoroughly how to estimate the cost of doing your own business. Clever man! You are to be congratulated on being the possessor of such knowledge. Let me point out a leak in your estimating. **Have you figured out in estimating the cost of doing your business how much it is costing you to leave the other fellow in the dark? Can you figure out the cost of perpetuating ignorant competition?** I wager you never did that. This is one of the most costly actions on your part. **It costs sometimes a great deal to do nothing.**

There are hundreds of master plumbers, many of whom we know, who spend hours in declaiming the faults of their fellow-plumbers from their point of vantage on the convention floor, and who have never spent as many minutes telling any one of their competitors how he could do business along legitimate lines. They realize that they are losing money at the hands of the price-cutting plumbers, but do not see the advantages of teaching the other fellow how to do better.

We receive daily letters from plumbers in all parts of the United States, commenting favorably on our departments, on our convention reports, on our special articles, and asking advice or assistance along specific lines. Throughout the majority of these communications, however, there always seems to be **the underlying spirit of "doing the other fellow." It is a wrong spirit, and it is retroactive. The losses cannot always be on one side. There is a swing-back to every pendulum.** Unless we are deeply interested in a kindly way towards all the members of the trade to which we belong, as a whole, we cannot expect that we can reap any more than a temporary advantage out of the business we do. When a man gets up on the convention floor and says: "I am not going to give up my figures and facts because it will give my fellow-members an advantage over me," **he has proclaimed to the world that he has ceased to learn anything.** He has reached his highest plane of attainment, and is now on the down-grade. He forgets that the world is still moving and that the figures and facts he prizes so much to-day will be of less value to him five years hence owing to changing conditions. He is of the same type with the man we are so familiar with, who is always shouting boastingly: "I have forgotten more than you ever knew." **He always is at a disadvantage, because he admits that he has forgotten it, and his past knowledge is no longer available.**

Since making our offer of distributing copies of S. H. Morgan's paper on "Losses in the Plumbing Business," we have had many inquiries from our interested readers, and the offer still stands good. Copies will be forwarded to all applicants. We recommend to all associations that reprints of this be distributed to all their members. If we get a sufficient number of orders, we will be able to make special prices at actual cost of printing, which will be easily within the reach of the funds of any association. If we desire educative work to be done, to teach the members of our trade to understand the cost of doing business, the work has got to be done by ourselves, and done now. **The time that we take to sit down and twirl our thumbs and groan about the faults of the other fellow, is merely adding to the cost of doing our own business.**

Squire Hotfoot is by this time pretty well-known to our readers. His excellent communications have been enjoyed by all and have been the source of inspiration to many. We have just received a letter from him on this important subject, and he has unburdened himself in his usual open-hearted fashion, presenting figures concerning his own business which will offer a profitable opportunity for comparison to all those who are endeavoring to bring their business to the highest possible point of success. Go over the items carefully. There are some items in his list which may not appear on your own. You may be able to profit by spending money in similar channels.

Letter and essays without number have been written on the above subject. All of them have some amount of good, but none of them cover the question completely and there is some doubt in my mind as to whether or not it is possible to do so. Accordingly, it behooves all of us to tell our own stories, to tell them carefully and thoroughly, that we may all profit by the other fellow's experience.

In my own case, I can only offer the results as found in my own business, and they may vary greatly from those submitted by other heating and plumbing contractors, who are probably better fitted to discuss the problem than is your humble servant.

However, my business for the year 1910 was in round figures $90,000, and at this time it might be well to add that I will make all items in round figures as close to the actual figures as is possible, for the convenience of the reader and ease in computing the totals.

Rent of building, barn and store yard	$300
Gas for water heater	25
Electric light and power	120
Heating of building	30
Telephone service, two lines	100
Book-keeper and office man	624
Collector and office assistant	624
Salary of proprietors, two of them at $25 per week	2,600
Man on stock and shop work	520
Tools—new ones and depreciation of old ones also	250
Advertising	600
Insurance, Fire, Liability, Firm	320
Credit guide, trade papers, books, license, dues	125
Auto supplies and depreciation	300

Stationery and printing	100
Taxes, real estate and personal property	150
Loss through bad accounts	250
Delivery cost, teamster, blacksmith, feed, etc.	1,200
Sundry items, without classification	500
Total amount of expenditures	$8,738

As we occupy a store building which we own, the item of rent covers the interest on the amount invested as well as an allowance for repairs and painting. The property is so situated that we have our complete establishment on one lot, thereby making it easier to oversee stock and condition of implements and wagons, and at the same time giving us the benefit of all of our horses' time as we avoid travel between shop and barn.

A gas water-heater is used for demonstrating purposes in our show rooms, for which a very small amount of gas is necessary.

Electricity is used for light as well as to furnish power for the operation of pipe-threading machine.

Heating is a small item, owing to the fact that a vast amount of boxes and crates accumulate during the summer months and are chopped into lengths suitable for use in the heater during the fall, and spring of the year before the coal fire is started.

There being two telephone systems in our city, the Bell and an Independent company, it is necessary that we have both lines.

During the past year, we employed a book-keeper of very little experience, who has made good, and who is entitled to and will receive a raise early this year, with the result that this cost will be increased somewhat.

We employ a man for collection work, taking out of permits, and the hundred and one errands which we find to do in the course of our daily work.

The item of salary to the two proprietors is self-explanatory.

One man is employed at all times, working around the shop, putting away stock, cleaning-up stock, getting out material for delivery, threading scrap lengths of pipe, melting old lead and converting the old wiped joints into solder, and also helping out the repair men when they need a helper for an hour or two.

There is a continual expenditure in any shop that is doing business for new tools and the repairing of old ones, and it is a very difficult matter to estimate the depreciation of the tools already on hand, and accordingly this item is largely one of guesswork.

We do a little advertising, probably more than the average shop, and we would do a whole lot more if we had sufficient capital to back up our advertising. There is no question that "Advertising Pays" and that it will bring results, but at the sime time there is a possibility that the results will exceed the ability of the advertiser and accordingly this item should be governed with exceeding care.

Sufficient fire insurance should be carried at all times, so as thoroughly to cover any loss which may occur. Liability insurance for the public and for your own employees is something that cannot possibly be dispensed with. Firm insurance, whereby each member of the firm has his life insured with the firm as beneficiary, is one of the very best propositions in the world. In case of death, the financial relief would be welcome indeed, while at the same time the cost is nominal. The increase in the valuation of such a policy will in a few years make it extremely valuable for various purposes and it is our intention to take out other policies every few years, thereby increasing our resources without materially increasing our expenses.

A credit guide, if to be had, and there are very few cities which do not have an association or a corporation which produces such a book, is something of vital necessity to every firm. Likewise, most cities have a paper dealing with the transactions in the court-house, liens, building permits, mortgages, satisfactions, judgments, etc., and this publication is worth far more than its cost and is worthy of close reading. Trade papers are invaluable, as are also various books published from time to time giving the ideas of the latest sanitarians and heating experts, and the master plumber and fitter would do well to read the trade papers carefully. Most cities require a license fee or bond or both, and there are also the dues to be paid into the local associations of masters, the commercial clubs, the builders' exchanges, and such other organization as tend toward a better acquaintance and a closer affiliation between men in the same calling.

An automobile, even though it be but a runabout of the cheapest kind, will pay for itself in jig time. One man with a machine can do as much work estimating and overseeing as can three men using street cars, bicycles, or horse-drawn vehicles, and the up-to-date master, who wishes to do any amount of work at all and at the same time give it the necessary attention, cannot possibly do without a machine. The expense of running a small machine is but very little greater than the cost of keeping a horse and when the difference in the amount of ground covered is considered the horse is badly worsted.

Stationery and printing should be of a good quality and the forms should be such as are found to meet the demands of the business best.

Taxes are an item of which nothing more need be said.

Every business has its loss through bad accounts and although the greatest care be used, the best of us will get stuck once in a while.

Delivery cost is a big item. Some concerns find it profitable to hire their hauling done, letting the jobbers deliver the bulk of the material direct to the job, and only use a hired rig to move the tools and pick up material left on the jobs. This is a problem which depends entirely upon local conditions and must be figured accordingly. However, we include under this head the cost of feed, shoeing, wagon and harness repairs, teamsters' wages, depreciation, and cost of hired teams in busy times.

Sundry items includes charitable gifts, loans (?), contributions to fairs and church and society programs, convention trips, and a generous allowance for other expenditures of various kinds.

In round figures, we assume that 10 per cent represents the cost of doing business for our concern, although we could cut a few corners and shade this a trifle, but it might be detrimental to the business.

These items having been computed from our books and having been very carefully checked, demonstrate to us that the percentage is very nearly correct, particularly as they have amounted to about the same figure for the past five years and we have every reason to think that our figures are correct.

In conclusion, I would say that it is vital to every man carefully to consider the expenses necessary properly to conduct a business. He should learn first of all that one man cannot do everything and that it is absolutely necessary that he employ capable assistants; that he own or lease for a number of years a place of business; that he carry proper insurance of all kinds; that he advertise ac-

cording to his size; and that he give due attention to all of the other details of what is, in my opinion, the most complicated game of business yet devised, a game that requires a live man and a many sided man to make it a winner.

Since writing the above, the writer has had occasion to attend several conventions of the hardware dealers, and the question that appears to be uppermost in their minds is this very same question of "overhead expense." Numerous speeches were made on the subject and a number of first-class essays were read and commented upon, and the sum and substance of the matter seems to be that the hardware man is really selling the greater part of his line at a loss and trusting to a good stiff price on the rest of his goods to even up on. Accordingly, the hardware dealer finds that such stuff as he is willing to handle without profit is the very same stuff that the "mail-order houses" do not care to handle for the very simple reason that there is no money in doing so, and any of you who have read the annual report of Sears, Roebuck & Co. can readily see that they are out for the money. On the material which the hardware man sells at a long profit, the mail-order man offers competition.

One hardware dealer, to illustrate the point, showed how he had sold goods costing him $18 for $22.50 and congratulated himself that he had just cleaned up $4.50 by a few moments' work, but when he had added the percentage of overhead expense to the net cost of the goods he found that instead of costing $18 that the goods had really cost him $22.05, as his overhead expense amounted to 18 per cent of the cost of his gross sales, and accordingly the profit was 45 cents. Now that shows the point clearly. We should think of the cost of the goods with the overhead expense added, not the invoice price, and if we would think of the cost as $22.05, we would be more likely to feel that we were gifted with backbones and could ask for a decent profit.

Let us carefully examine into our cost of doing business and sell our goods accordingly, and we shall have no fear of the sheriff and his mighty men.

"The Squire."

INDIANAPOLIS MASTER PLUMBERS AND HEATING CONTRACTORS ISSUE IMPORTANT NOTICE.

Plumbing and Heating Contractors of Indianapolis, Ind., have just sent out a notice of more than ordinary interest to the trade and particularly to manufacturers and jobbers of plumbing and heating supplies. The notice is issued in printed form and is addressed "To Whom It May Concern." It is reprinted here at their request and reads in full as follows:

"At a meeting of Plumbing and Heating Contractors of Indianapolis, Indiana, held Wednesday evening, December 21, 1910, the following resolutions were introduced and unanimously adopted:

"Whereas, that in the completion of contracts of plumbing and steam fitting, defects of various kinds and character appear in the material and on so-called tested goods specified, when as a matter of fact the defects and damaged condition of appearance of the materials are due solely to the inherent defects in said material which could not be noticed and were unknown at the time of installation; and

"Whereas, by the reason of stress, heat, cold or other causes beyond our control, said materials develop imperfections which we are required to make good; and

"Whereas, these guaranteed or so-called tested materials are guaranteed to the contractor only so far as replacing other materials, and the cost of labor in making these changes is borne by the contractor; and

"Whereas, these conditions have been imposed upon us, and we have been compelled to furnish indemnity against such conditions for a period of one year, and that from time to time the period of guarantee has been increased until now in many cases the contractor is liable for a period of five years, thereby now entailing all damages and injuries and cost arising out of such defects, and also entailing and continuing liability upon our estates, to our detriment; and

"Whereas, the executing of bonds for such long periods works as a detriment to the contractor, as often the witnesses have disappeared, firms have changed and gone out of business, testimony is almost impossible to secure, and the financial condition of the principals has materially changed; and

"Whereas, in the execution of such bonds the contractor is held liable for the full period of time, and also must pay the bonding companies additional premium for the execution of such bonds; and

"Whereas, for these additional requirements and for the further and final reasons that it is unjust and inequitable for the owner or agent of the property to demand or require us to guarantee materials installed which were not of our making and which were forced upon us by other parties; therefore, be it

"Resolved, That in view of these unjust and inequitable and wholly one-sided conditions and for the benefit of our customers, as well as ourselves and the public at large, we emphatically and unqualifiedly protest against the same.

"We hold that the proper and business-like method, and one which would be fair for all, would be for the owner to require an indemnity bond from the manufacturers of such articles as to defects in their goods so furnished, and to require a surety bond from us to guard against unskilled workmanship upon our part.

"That any such fixtures, material or devices developing defects after installation by the contracting master plumber or steam-fitter, the manufacturer, supply house or middle men be required or compelled to furnish suitable fixtures, materials or devices, free of cost or expense to the contractor, and that the contractor be reimbursed by the vender of such defective goods for the reinstallation of same.

"That on the completion of a contract and the acceptance of same, the responsibility of said contractor is to cease.

"We, the undersigned plumbing and heating contractors of Indianapolis, Ind., therefore, desire to serve notice upon the manufacturers, wholesalers, jobbers and builders that we will not enter into any such indemnity or surety bond requiring us to guarantee against defects of materails we have not made, from and after the passage of these resolutions."

J. S. Farrell & Co., Herman A. Goth, W. H. Johnson & Son Co., Geo. W. Keyser, Geo. H. Rickes, Jr., Hayes Brothers, Inc., Paetz & Klotz, W. H. Caswell, G. A. Wurgler, Lawrence Betz, J. D. Irwin, J. A. Diggle, C. Aneshaensel, Cook Bros., Kirkhoff Bros. & Co., L. B. Skinner, E. A. Strong, Jos. F. Haslinger, Chas. Toon, F. E. Trosky, Freaney Bros., G. F. Kleder, Kruse & Dewenter Co., F. P. Marien, L. V. Prinzler, R. O. Shugert, Fred G. Janitz, W. W. Wilcox, H. F. Zietlow, T. J. McCarthy, Marshall & Elder, V. A. Vestal, C. B. Haines & Co., J. T. Payne, Beinburg Bros., J. W. Rich, Curtis E. Burke, Locke & Anderson, Oscar Hermann, B. Gundelfinger, Clarke Bros., Foley Bros. Co., B. F. Shaffer, James A. Kreglo & Co., Frank Stewart, C. L. Peck, Jacob Arnold, James B. Smith, William F. Courtney, Geo. E. Conrad, Winter & Wilson, L. P. Simon, R. Henninger, Ramsay & Arthur, Wert O'Donnell, James McGauly & Son, Albert E. More, Geo. Slick & Co., W. T. Lemmink, Henry M. Mock, Geis & Co., H. W. Denges & Co., Freyn Bros., The Bassett Co., Woollen & Callon, Ed. McGutt, M. A. Zeller, J. W. Meyers, Greilich & McClintock, White & Kavanough.

WISHES TO ABOLISH THE COMMON DRINKING CUP IN WASHINGTON.

Representative Small, of North Carolina, believes in the abolition of the common drinking cup so much that he has presented a bill in the House of Representatives prohibiting its use in the District of Columbia after the passage of the bill. The measure also empowers the commissioners with authority to make regulations on the matter.

THE 10TH ANNUAL CONVENTION OF THE MASTER PLUMBERS' ASSOCIATION OF CALIFORNIA.

Held at Fresno, April 17-21, 1911.

The 10th annual convention of the Master Plumbers' Association of California was held at Fresno April 17-21 and was one of the most successful meetings of the kind ever held in the state, from both the amount of interest displayed and the attendance. For several years the Fresno plumbers have been inviting the state body to hold its annual convention in the Raisin City, but this is the first time that the invitation was accepted. The plumbers there, although small in numbers, entertained in a fashion that has never before been approached and what was lacking in experience was more than made up in other ways.

The attendance was very heavy, there being about 400 visitors present, and all sections of the state were represented. The surprise of the week was the splendid manner in which the San Diego delegation turned out, there being as many present from that city as from Los Angeles. Every plumbing shop in that city affiliated with the Master Plumbers' Association sent a representative, and from several of them two master plumbers made the trip. From the moment they landed until they left for home this delegation boosted for San Diego and it has already been virtually decided that the annual convention in 1914 will be held in that city. It has also been settled that in 1915 the San Francisco plumbers are to entertain the plumbers of the state, giving them an opportunity to visit the World's Fair at the same time.

On the opening day the meeting was called to order by Pres. Thomas Haverty, of Los Angeles, who made a short address. Clarence L. Foin, president of the Fresno local, also made a short address and introduced Dr. Chester Rowell, mayor of the city and one of the most popular men in that part of the country. Mayor Rowell extended the welcome and freedom of the city to the visitors and then spoke of the efforts of Fresno along the lines of modern sanitation. He displayed a wide knowledge of sanitation in general and declared that the mission of the plumber was one of the most importance to mankind.

Following the report of the Credential Committee, the plumbers at once commenced the transaction of business and during the afternoon session the work of the week was outlined and a number of committees named. In the evening a reception to the visitors was tendered by the Fresno plumbers and their wives in Lecture Hall Club, which was largely attended. An excellent musical entertainment was provided by professional and amateur talent, some of the visitors assisting. Tuesday morning at 10 a. m. the convention again assembled for business. Practically the entire morning was taken up by a discussion of the merits of the Milwaukee credit system and the advisibility of adopting it in this state if jobbers were agreeable. It was decided that there were some features of this system that would probably not be a complete success here and it was the general opinion that a system based on this one, but with certain changes, would be better. The entire matter was placed in the hands of a committee to make a thorough investigation of the proposition, learn the views of jobbers on the question, and frame a credit system that will meet Coast conditions.

On Wednesday morning the matter of public comfort stations received attention and some of the older members of the association called attention to the fact that it was from California that the national association received its first ideas on this question. The need of conveniences of this kind was forcibly called to mind and it was decided that the best plan of creating an interest in the question would be for plumbers in the various cities and towns to keep the matter constantly before public officials and to inform them of the progress that has been made in this line in other countries. In the afternoon the question of a state plumbing law was discussed at length and it was the consensus of opinion that it would be unwise to allow the matter to drop simply because for the second time a California governor has seen fit to refuse to make a law of the bill presented to him by the state legislature. A new bill will be drafted before the next session of the legislature and an effort will be made to have one with which the governor cannot find fault on the grounds of unconstitutionality, as was the case with the last one.

The business session of the convention ended on Thursday with the election of officers to serve during the ensuing year as follows: President, Frank J. Klimm, San Francisco; vice-president, Ed. W. Crowell, Los Angeles; secretary, John L. E. Firmin, San Francisco; treasurer, William F. Wilson, San Francisco; past president, Thomas Haverty, Los Angeles. The executive board consists of these and the following: John Cahill, Sacramento; Chas. H. Julian, San Diego; and William Rowe, Fresno. The assistant secretaries chosen were V. W. Guerico, Los Angeles, and Fred Heilbron, San Diego. Frank J. Klimm and Alex. Coleman of San Francisco, and L. H. Arnold of San Diego were chosen delegates to the national convention to be held in June at Galveston, Texas, and Frank J. Klimm was recommended as the choice of the California body for a place on the national executive committee. No place was named for the 1912 convention, which is to be selected later.

You will see the photographs of some of the chief factors in this comet's appearance on page 141. The tail is getting larger every issue, but our columns are only 7 in. wide. Still, you can see that the comet has risen six lines since last issue. You will see it in its fullest glory at Galveston.

Which Boiler was Over-rated? All Three.

By Frank L. Busey, Engineering Experiment Station, University of Illinois, Urbana, Ill.

Our attention has been called to an article in the March 4th number of "Domestic Engineering" regarding boiler-rating, in which a list of published ratings was given for three different makes of round boilers. The question was asked: Which of the three was right and which was wrong?

Based on the results of several hundred tests on various styles of boilers and furnaces, it is evident that all three are over-rated—in some cases as much as 100 per cent. A study of the accompanying table and diagram should convince the most skeptical that this is the case. This table gives the sizes and ratings of the three boilers as published in the article referred to, together with the amount of coal per square foot of grate surface per hour necessary in order to make sufficient steam to supply the rated surface. This is assuming an efficiency of 50 per cent, which is considerably too high for the excessive rate of combustion noted.

The values in this table, as also the diagram, are based on the recent report of the committee to the A. S. H. & V. E.—that is, 12,000 B. t. u. per lb. of coal and 250 B. t. u. given off by each square foot of radiation surface per hour. There is one objection to this report, in that it leads us to expect higher efficiencies than we are likely to obtain with small boilers. The values should have been tabulated for 30 per cent to 60 per cent rather than from 50 per cent to 75 per cent. These higher figures are frequently attained in power-boiler work, but seldom, if ever, in small house-heating installations, which are more likely to give efficiencies under 50 per cent than over.

The diagram is computed for six sizes of grates, 19, 22, 25, 28, 31 and 34 in. in diameter, and for efficiencies of from 30 per cent to 60 per cent for each boiler, with coal consumption up to 15 lb. of coal per square foot of grate surface per hour. Knowing these factors, the capacity of a boiler can be determined at a glance, or knowing the surface to be carried and the efficiency expected, the coal consumption for the different sizes of grates can be determined.

As an example of the use of the diagram, let us assume that we have a job requiring 1,000 sq. ft. of surface, and that when burning 8 lb. of coal per sq. ft. of grate per hour we are likely to obtain an efficiency of about 50 per cent with a well designed boiler. What size of grate will be required? First, examine the curve for the 28-in. grate and we find the vertical line through 1,000 sq. ft. cuts the 50 per cent efficiency line at 9.75 lb. of coal, and the 60 per cent efficiency line at 8 lb. of coal. Then, if the boiler looks good to us and we are persuaded that it might make an efficiency of 60 per cent, this size of boiler would answer. If not, we will proceed to examine the curves for the 31 in. grate. Here the vertical line through 1,000 sq. ft. of surface intersects the horizontal line through 8 lb. of coal at 50 per cent efficiency, which is just the condition we are seeking.

Let us assume another case, where a boiler having a 28-in. grate is rated at 1,500 sq. ft., and determine the coal consumption. Looking at the diagram for a 28-in. grate we find the vertical line through 1,500 sq. ft. intersects the 50 per cent efficiency line at about 15.5 lb. of coal per sq. ft. of grate per hour. The 8-lb. line cuts the 50 per cent efficiency line at 725 sq. ft. of surface-line, which is the surface at which the boiler should have been rated. Directly above, we find this vertical line cuts the 50 per cent efficiency curve at the 10-lb. coal-line, indicating that even with a 34-in. grate it would be necessary to burn 10 lb. of coal per sq. ft. of grate per hour.

The possible efficiency is the uncertain quantity, depending on so many factors that are difficult to ascertain, such as shape and position of heating surface, ratio of heating surface to grate area, rate of combustion and consequent temperature of flue gases.

Referring again to the table, it will be noticed that to carry the rated capacities on the smallest boiler would require the burning of from 9.5 to 16.4 lb. of coal per sq. ft. of grate per hour, and from 12.2 to 18.3 lb. in the boiler having a 28-in. grate. I don't mean to say that these rates of combustion are impossible, for I have burned around 15 lb. of coal per sq. ft. on a 28-in. grate, but it required a good draft, the ash-pit door wide open, flue-gas temperature averaging considerably above the 600 degree mark, and was decidedly hard on the boiler. And the efficiency was—well, a long jump below 50 per cent. Referring to the diagram it will be noted that if these boilers were operated at only 40 per cent efficiency, the coal consumption would go beyond all possible limits.

The last three columns of the table give the ratings for these boilers when burning 6 and 7 lb. of coal at 50 per cent efficiency, and 8 lb. at 40 per cent efficiency. Any other combination of rate of combustion and efficiency can be taken off the diagram. These columns show a conservative rating for each size of boiler when operated at a fair rate of combustion and efficiency.

Another point to be considered is the fuel capacity and the possibility of carrying the load over a considerable length of time with one firing. A boiler with a 28-in. grate would probably have a fuel capacity of 200 lb. of coal at one charge, or 46.5 lb. per sq. ft. of grate. If this is burned at the rate of 15 lb. per hour, the fire will burn out in about three hours' time, an interval entirely too short to suit the majority of users. On the other hand, if the rate of combustion is reduced to 5 lb. per hour, the same amount of coal would last 9 or 10 hours.

These small boilers will reach their highest efficiency when burning from 5 to 7 lb. of coal per sq. ft. of grate surface per hour—for rough calculations approximately 50 per cent. When forced much above 8 lb. the efficiency falls off, and the stack, ash-pit and radiation losses go skyward.

Everything considered, it is evident that these boilers will not carry their rated surface as listed, at least in severe weather, with any degree of satisfaction to the purchaser, and the chances are the dealer who installs them will have to replace them with a larger size.

You can study the diagram on the opposite page to advantage. It is interesting and instructive. The way to use it is clearly shown in the examples given.

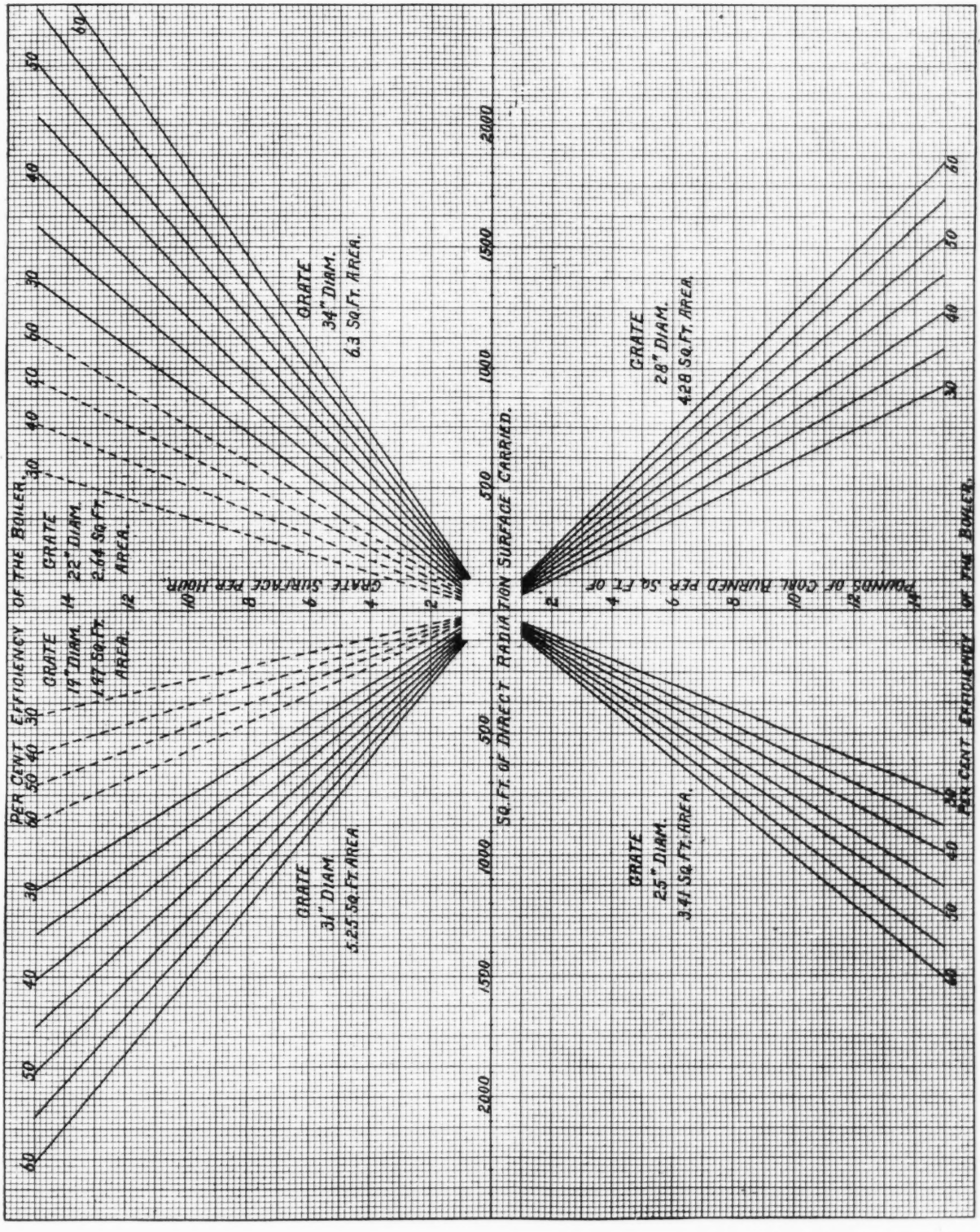

PER CENT EFFICIENCY OF THE BOILER
GRATE 18" DIAM. 1.77 SQ. FT. AREA.
GRATE 22" DIAM. 2.64 SQ. FT. AREA.
GRATE 31" DIAM. 5.25 SQ. FT. AREA
GRATE 34" DIAM. 6.3 SQ. FT. AREA.
GRATE SURFACE PER HOUR
SQ. FT. OF DIRECT RADIATION SURFACE CARRIED.
GRATE 28" DIAM. 4.28 SQ. FT. AREA
GRATE 25" DIAM. 3.41 SQ. FT. AREA.
POUNDS OF COAL BURNED PER SQ. FT. OF
PER CENT EFFICIENCY OF THE BOILER.

Diagram of Boiler-Ratings and Efficiencies

PIPE-LINE DESIGN FOR CENTRAL-STATION HEATING.*

By B. T. Gifford, Member A. S. H. & V. E.

The author will endeavor to outline a method he has used in designing central-station heating pipe-lines as to size and capacity, and give such information and facts as he has found to be reliable, also some curves which he has found to be trustworthy.

It is not the intention to convey the idea that this method is the most perfect, but rather to explain the method with the hope of bringing out a discusssion along the lines of this paper.

In the design of a central-station heating plant two things must be definitely determined: the location of the central station and the amount and location of the business to be served. The location of the power house should be governed by the location of the territory to be served, also the urgent need of a switch for fuel purposes. In fact, about the same things determine the location of a heating plant as would determine the location of any central station. The business to be served is in many cases very difficult to ascertain, owing to the uncertain growth of the city, and the fact that it is necessary for financial reasons, to have, if possible, every foot of pipe line earning some return on the money invested in it. New buildings will be built and the present buildings may be enlarged, so a great deal of care and thought should be spent on this part of the design.

A method the writer has used for some time with very satisfactory results is as follows: First, prepare a map of the city drawn to scale, and of a convenient size to carry in the field; sometimes it is necessary to divide the map into two or more parts. Show on this map all streets and alleys, and the relative elevation of each street intersection. Note also the paved streets and the kind of pavement. On the map show also each building and its location and mark the kind of building, whether business, church, residence, bank, hotel, etc.; together with this, the number of feet of radiation it will require to heat each building. After this information has been secured, make a survey and a careful study of the different sections of the city, noting on the map the best sections for the central heating plant to serve, taking into consideration at all times the future growth of the city. It is in this part of the design that experience is needed, and many times the engineer will find he has made a poor guess. The word "guess" is used because in many cases central heating plants have grown beyond the wildest dream of their designers.

In a good residence section of homes, owned by people of moderate wealth, 90 per cent. of the present business will be connected within five years. Any vacant lots in such a section should be considered as built up with a building to compare favorably with the surrounding buildings.

In a business section 60 to 70 per cent. of the available business will be connected within five years. This is greatly dependent upon the kind of heat to be sold, whether steam or water, and whether the buildings are already equipped for heating with steam or water. As a rule steam service is more popular in business sections, while in residence sections water seems to be more universally sought.

The rapidity with which business is connected to a plant depends upon the company managing the property, but the designer should anticipate a rapid growth in the number of consumers and the amount of business. After having determined the location and amount of business

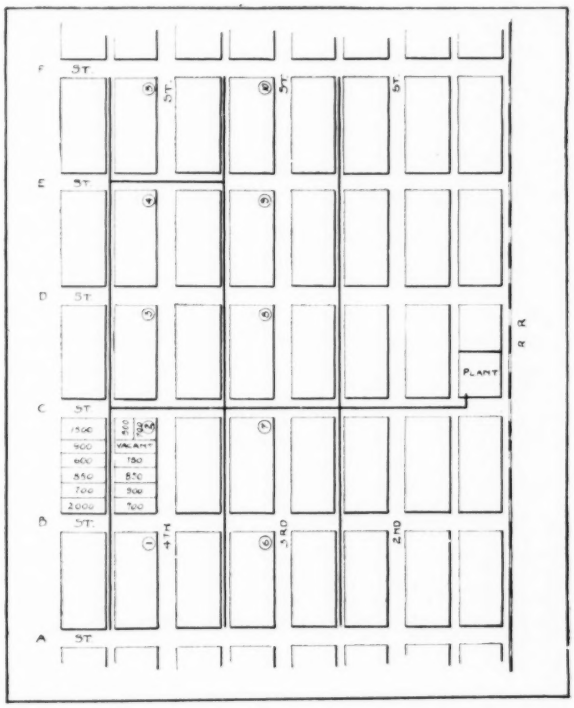
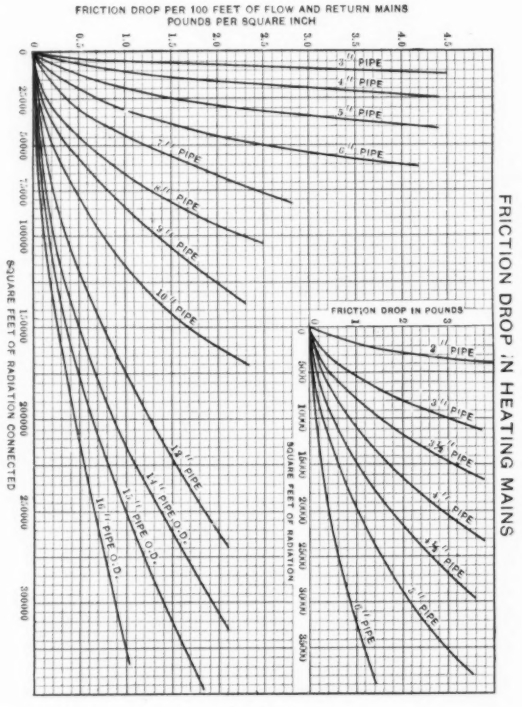


Fig. 1.


FRICTION DROP PER 100 FEET OF FLOW AND RETURN MAINS
POUNDS PER SQUARE INCH
FRICTION DROP IN HEATING MAINS
SQUARE FEET OF RADIATION CONNECTED
FRICTION DROP IN POUNDS
SQUARE FEET OF RADIATION

Curve 1.

and the central station location, work on the detail design can be started.

Commence by laying in the lines on the map, in such a way

*Read at the 17th annual meeting of the American Society of Heating and Ventilating Engineers, held in New York City, Jan. 24, 25 and 26, 1911, and reproduced here in excerpt form in accordance with the society's rulings.

as to reach the greatest amount of business on the least number of feet of pipe line. This requires oftentimes the cut-and-try method. Whether to use alleys or streets depends upon two things. First, the relative cost of street and alley construction; second, the location of the buildings relative to the street or alley. The author has found that alley construction, other things being equal, will cost 15 to 30 per cent. more for the labor, owing to the difficulty of working in such a narrow place. Another thing affecting the cost of construction is the pavement which has to be taken up and relaid.

In most cities the heating companies are obliged to bring their service-pipes to the curb-line in the street, and to the property-line in the alleys. This item of expense should not be overlooked, for in a wide street the extra cost for service lines will more than eat up the saving in labor effected by street construction.

We will assume for calculation a good residence section, as shown in Fig. 1, Block 2. We can assume that we will get 90 per cent. of the available business in this block, which is approximately 10,500 sq. ft. of water radiation, or approximately 6,300 sq. ft. of steam radiation.

We are obliged to allow for future extensions for Block No. 1, and possibly more yet, but in this lay-out we will assume that eventually Block No. 1 will equal Block No. 2. Block No. 2 is 400 ft. long, and Block No. 3 is the same length. We have altogether 21,000 sq. ft. of water radiation to handle, but some of it will be taken off in the first 100 ft. and about 25 per cent. of it will be served by the time we reach the centre of Block No. 2, 25 per cent. more will be taken off by the time we reach B Street, and 25 per cent. off when we reach the centre of Block No. 1; the last 25 per cent. by the time we reach the west side of Block No. 1.

In designing a central-station hot-water pipe-line, the author has found it better practice to throw most of the line friction in the trunk line and to have the friction loss in the laterals very small, and to make the friction loss in the laterals in proportion to the circulating pressure (difference in pressure) at the point the lateral begins. As example we will assume that at the point the lateral for Blocks No. 1 and No. 2 the circulating pressure is 5 lb. Now we must have at least 1 lb. of circulating pressure at the end of the lateral, therefore we can lose 4 lb. in friction between the ends of the lateral, or 1 lb. per 200 ft., which is five-tenths of a lb. per 100 ft. We then have the following condition:

	Sq. Ft. Rad.
First 200 ft. of line must handle	21,000
Second 200 ft. of line must handle	15,750
Third 200 ft. of line must handle	10,500
Fourth 200 ft. of line must handle	5,250

From curve No. 1 we find a 6-in. pipe will handle 21,000 sq. ft. with this friction loss, and 5 in. will handle 15,750 sq. ft., 4½-in. pipe will handle 10,500 sq. ft. with a one-half lb. loss, and a 3½-in. pipe will handle 5,250 sq. ft. of radiation with this friction loss.

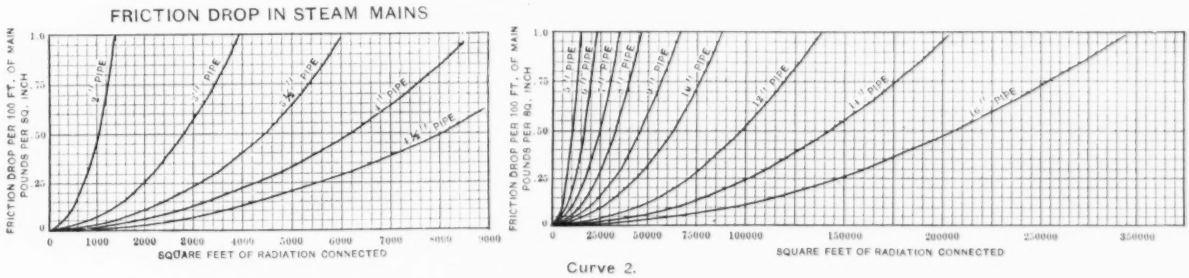
A rule the author has followed is to never run a smaller water main than 3-in. in the initial lay-out; this will always allow for some future extensions.

In figuring a branch line off of a lateral, consider the circulating pressure at the point the branch leaves the lateral as the originating pressure and one pound as the circulating pressure at the end of the branch. Some very interesting problems are found in this work.

The author advocates the use of pipe bends instead of elbows or fittings in the lateral lines.

There has been a practice made use of by some engineers to run a larger return line than flow line, for instance, a 3-in. flow and a 4-in. return line. This method, it is claimed, gives a more equal circulating pressure all over the pipe line system. The author has found that by limiting the heavy friction loss to the main trunk lines, this objection is equally well overcome and the investment is slightly reduced.

In designing a central-station steam pipe-line the same general plan is used. In this case, however, the friction loss is dependent upon the maximum back pressure allowed on the engines if connected as a by-product plant. A live-steam central-heating plant should be designed along the same general plan as a hot-water heating system, with 25 lb. as the maximum pressure on the pipe-line. Curve No. 11 shows the curves used for the steam-pipe capacities.



Curve 2.

Assuming the same territory, viz., Blocks No. 1 and 2, to lay out a steam-heating pipe-line. In this case we will also assume that the original pressure where this line begins to be 3 lb. We will want at least 1 lb. pressure at the end of the line. We can, therefore, lose 2 lb. in friction. This allows us .25 lb. per 100 ft. In the case of steam-pipe line we have the following conditions:

	Sq. Ft. Rad.
First 200 ft. of line must handle	12,000
Second 200 ft. of line must handle	9,000
Third 200 ft. of line must handle	6,000
Fourth 200 ft. of line must handle	3,000

From curve No. 11 a 6-in. line will handle 12,000 sq. ft. of radiation, a 5-in. line will handle 9,000 sq. ft., but the friction-loss will be too great (.54 lb.), therefore we will continue the 6-in. 100 ft. beyond the first section, viz., 300 ft. in all, and the last 100 ft. we will make 5-in. A 4½-in. line will handle the third section of 6,000 sq. ft. of radiation and a 4-in. will suffice for the last section handling 3,000 sq. ft. As in the case of hot-water heating, there should be a minimum size to install as a main and in steam-heating the author has fixed upon 4-in. as a minimum. The above pipe sizes are figured with the steam and condensation going in the same direction. If going in opposite direction a greater friction loss will be sustained.

There are, of course, other methods of designing central station pipe lines somewhat more elaborate and a great deal more lengthy, but the method outlined is accurate for any central station lay-out, and has the advantage of being rapid as well as reliable.

A PRACTICAL MANUAL OF STEAM & HOT-WATER HEATING

BY EDWARD RICHMOND PIERCE

In this installment Mr. Pierce continues to emphasize how important it is for the hot-water heating man to know the weight of a cubic foot of water and its varying volume at different temperatures, and also the amount of pressure according to the length of the column from bottom to the air at top. The height governs the pressure, and this determines the time required for circulation to begin.

SECTION XL.

In Fig. 24 the pressure on the bottom of the system is that due to a column of water 34 ft. high or 14.7 lb. above atmosphere, to which must be added the pressure of the atmosphere, or 17.4 lb. more, therefore, each particle of water at the bottom before it can start up from the bottom must reach a temperature of at least 250 deg. Fahr., as it is only at that temperature that a pressure of that amount is equalized. When one particle has absorbed that much heat it will have the power to overcome the pressure on it and to rise up in the receptacle because it has increased in strength, and although it now possesses the power to shoot straight to the top of the column if unobstructed, it does not do so. The first obstruction to its progress up is the fact that as soon as it finds itself under a less pressure it immediately expands itself in size, and in doing this parts with some of its acquired heat to the particles with which it comes into contact. As soon as it has

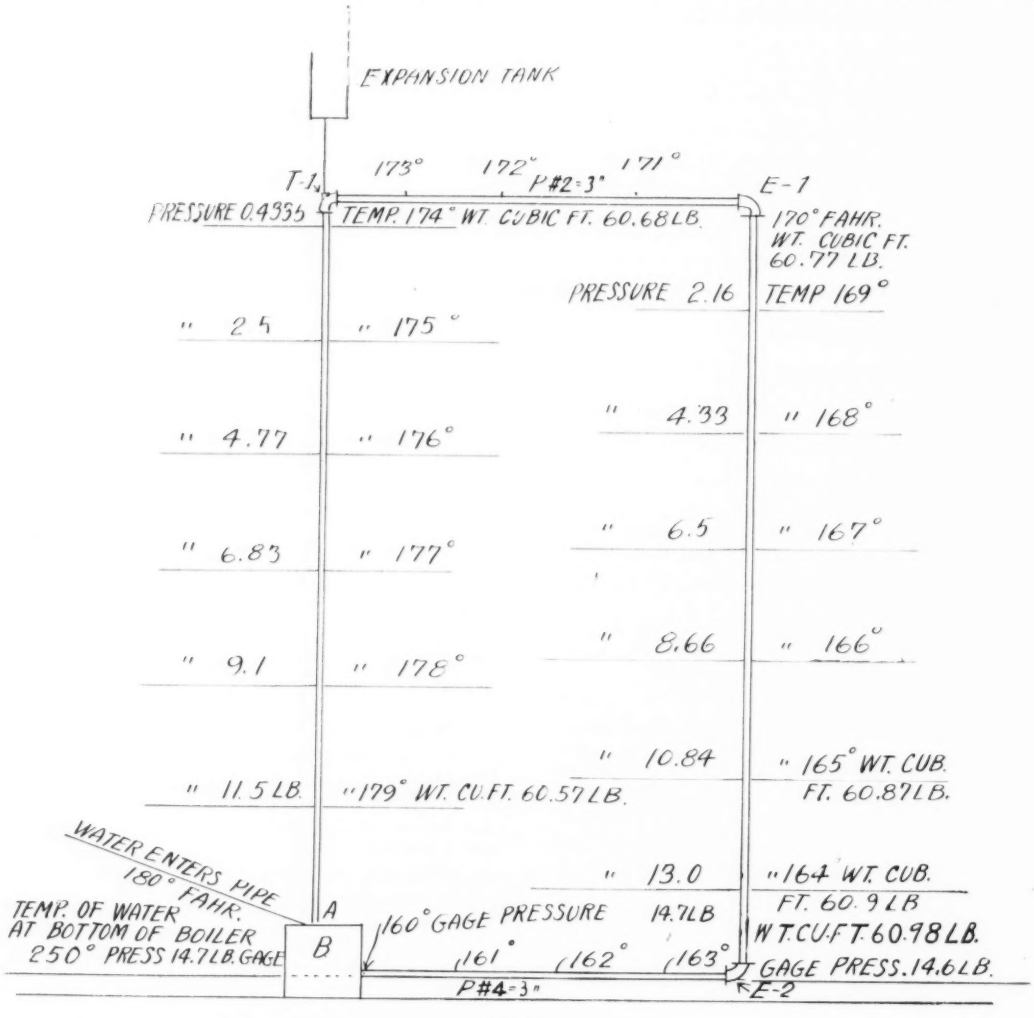


Fig. 24

parted with so much power that it is equal in size and strength to the particles with which it is in contact, and can no longer overcome the pressure put on it by the height of water above it, it will either remain in a nearly stationary position until it receives more heat by contact with other rising particles, or it will drop towards the bottom again and remain there until it receives the necessary heat to give it the power to overcome the pressure on it and to rise toward the top again. It is this action that keeps the water circulating. The difference in the weight between the warmer and cooler water in the flow pipes is a secondary movement which is produced by, and from, the first cause just explained.

Let us investigate this matter a bit with the aid of Fig. 24. We will suppose that the system is filled with water when it has a temperature of 62 deg. Fahr., when each cubic foot will weigh 62.355 lb. From Table LZ it is seen that each lineal foot of 3-in. pipe will hold 0.049 of a cubic foot of water. The 34-ft. pipe will hold 1.66 cubic feet. One cubic foot of water measures or contains 7.4805 gals. One gallon of water weighs 8.3356 lb. The total weight of the water in the upright 34-ft. columns E1-E2, will be 103½ lb. (7.4805×1.66×8.3356=103½.)

Assuming the total length of the horizontal pipes to be 36 ft. the total length of all the 3-in. pipe suggested by Fig. 24 will be 102 ft. (32+36+34), and the pipe alone will hold 5 cubic feet of water, weighing 310½ lb., **all of which must be put into motion to produce circulation,** and in addition to the water which the pipe will hold there is an additional quantity in the receptacle or boiler itself that must be made to move.

If we apply heat to the receptacle B for a sufficient length of time and in sufficient amount the temperature of all the water in the system will become raised to any desired temperature below 212 deg. at any point in the system, if applied under conditions usually found in the average house-heating job. To accomplish this, however, all that weight of water must be moved up and down and over a great many times, and something more than the difference in the weight of the rising and falling columns of water in pipes P1 and P3 will enter into the process.

As boilers for hot-water heating are now rated as being capable of heating to 180 deg. the usual amount of water held in a heating system with the amount of radiating surface each boiler is rated to carry, commencing at the point where the pipe is attached to the boiler (a on Fig. 24), and to return to the boiler at 160 deg., perhaps it will be well to examine into this difference of weight proposition from those temperatures. Especially so, as we have already seen that the actual pressure on the crown-sheet of a hot-water boiler before there is any heat applied is several times greater than the new ratings for steam-boilers permit for a steam job.

With the simple lines of Fig. 24 to aid us we arrive at the following fact: That the water contained in first foot of pipe attached to the top of the boiler weighs .02 lb. less than the water in the last foot of pipe which is connected to the boiler as the return.

One foot in length of a 3-in. pipe holds 2.97 lb. water of 180 deg. temperature. The same length and size of pipe holds 2.99 lb. of water of 160 deg. temperature, a difference of .02 lb. The equivalent of .01 lb. is 70 grains. The total difference, then, in practically 3 lb. of water at 180 deg. and 160 deg. is 140 grains. As 437½ grains equals one ounce, the difference in the weight of these three first and last pounds is less than one-third of an ounce. If we are to take the statement usually handed out by the hot-water fitters in regard to what causes the water to circulate, we must conclude that .01 lb. weight in a hot-water apparatus is many hundred times more effective than anywhere else on earth. Four inches of the 3-in. pipe will hold 1 lb. of water, and the last pound is the heaviest and has the greatest velocity of any pound of water in the system and, therefore, is the propelling power that moves the whole mass according to the proposition that is usually advanced by fitters as being the cause or power which circulates the water in the heating-pipes.

The absurdity of the proposition is evident the moment that any person takes the time to examine it as we have in this case. That over 300 lb. of water will, or can, be elevated over 30 ft. and forced through more than 100 ft. in length of 3-in. pipe with elbows to turn

TABLE L Z.

Showing the quantity of water held in one lineal foot of pipe in gallons, quarts, pints and gills. Also the weight in pounds and ounces. The length in ft. of each size of pipe that will be required to hold 1 cubic foot of water. Also the cubic feet held in one lineal foot of each size of pipe at 40 degrees Fahr. and at sea level.

Size of Pipe Diameter in In.	Gallons in 1-Ft. Length	Weight in 1-Ft. Length		Length in Lin. Ft. Required to Hold 1-Cu. Ft. of Water	Quantity Held				Cu. Ft. in 1 Lin. Ft. Length
		Lb.	Oz.		Gal.	Qt.	Pt.	Gill	
1.	0.045	0	6	167.	0	0	0	1.1/2	0.006
1.1/4	0.077	0	10	96.1/4	0	0	0	2.1/2	0.011
1.1/2	0.105	0	14	70.2/3	0	0	0	3.1/2	0.014
2.	0.174	1	7	43.	0	0	1	1.1/2	0.025
2.1/2	0.249	2	1	30.	0	1	0	0.	0.034
3.	0.384	3	3	19.5	0	1	1	0.1/4	0.051
3.1/2	0.514	4	5	14.5	0	2	0	0.1/2	0.068
4.	0.661	5	8	11.33	0	2	1	1.1/8	0.088
4.1/2	0.829	6	15	9.	0	3	0	2.1/2	0.111
5.	1.062	8	10	7.	1	0	0	2.	0.136
6.	1.489	12	8	5.	1	1	1	3.5/7	0.199
7.	1.998	16	12	3.75	2	0	0	0.	0.267
8.	2.596	21	11	2.88	2	2	0	1.5/7	0.347
9.	3.259	27	3	2.29	3	1	0	0.5/7	0.436
10.	4.095	34	2	1.83	4	0	0	3.	0.547
11.	4.937	41	2	1.52	4	3	1	2.	0.659
12.	5.875	49	0	1.27	5	3	1	0.	0.785

in the distance by a pressure of less than 50 grains to the pound, is hardly probable.

It is time that the advocates of hot-water heating get down to practical facts in regard to the circulation of water in this very excellent method of heating, and they will certainly have to do so if they expect to hold their own in the competition which is arising from the vapor-steam, vacuum, non-pressure steam and other similar projects of the steam men who are giving thought to the development of their business.

(To be continued.)

EXPANSION CAUSES TROUBLE.

By W. H. Wakeman.

The accompanying illustration shows a brick pier that was built by a helper to support a hot-water pipe. He thought that by banking cement against both sides of the pipe, it would be held firmly in place. He was right to a certain extent, because the pipe was fastened securely to the top bricks, but when heat repeatedly expanded the

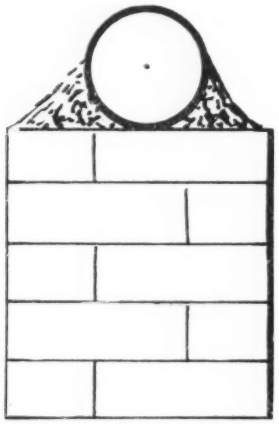


Fig. 1.

pipe, it broke the pier where the cement had a poor hold. It is perfectly sound at all other points, but about two-thirds of it moved directly over, leaving the lower part in its original place.

When the pier was rebuilt, the top was made as smooth as possible with the materials at hand, and a piece of iron pipe put on top of the pier, thus allowing the hot-water pipe to move easily whenever it expands or contracts, without disturbing the pier as it rolls on the pipe.

NEW CONTRACTS AWARDED.

New heating, lighting and plumbing contracts have been announced in the Pittsburgh territory during the last 10 days as follows:

Latrobe, Pa.—Hugh Cannon, plumbing in $2,500 residence of Joseph B. Kattan.

Greenville, Pa.—Greenville Plumbing Co., $4,000 store building for J. C. Brackin, Greenville.

Pittsburgh.—T. A. Blackham & Co., $20,000 store-room, hall and lodge building for J. S. Murphy.

West View, Pa.—Hender & Lang, $4,000 cottage for John O. Nock.

Bellevue, Pa.—J. McKissock, $8,000 residence for William C. Oetting.

Bar Harbor, Me.—F. T. Young Co. has the contract for installing new plumbing and fixtures in the summer home of F. H. Johnson on Eden street.

IMPROVED HEATING OF ROOMS.

It is a fallacy to compare methods of heating rooms by the simple application of the thermometer, writes Dr. Percy Wilde in "The London Times." Thus, given a room to be heated for 10 or 12 hours a day, the various methods of heating, in order of cheapness, will run as follows: (1) Hot-water or steam radiators; (2) anthracite or closed coal stoves; (3) open coal fires; (4) gas stoves; (5) electric stoves.

Both the first two methods depend upon heating the air of the room by convected heat from metal at a high temperature. This decomposes the air of the room and renders it prejudicial to health. The coal and gas fires give radiant heat, which warms the objects in the room and only warms the air by the convected heat derived from them. This means that the air of the room is warmed by convected heat at a low temperature, which is alone sanitary. The fifth method, electric heating, is simply futile and has nothing to recommend it either on the score of efficiency, economy, or hygiene.

The gas and the coal fires are not economical because a current of cold air is passing through the fire to the chimney or flue pipe, which not only carries away the heat, but prevents its proper radiation. The whole problem of heating resolves itself into this: (1) Get rid of the flue pipe or chimney; (2) condense all the fumes; (3) allow none to escape into the room.

This is regarded as a scientific impossibility. Yet I write in a room where this process has been working for many months. It is a large room, and the cost of heating by gas is ½d. (⅔ cent) per hour. The method has not yet been made public, but until it has, discussion upon the subject of domestic heating can lead to no result. The latest discoveries will revolutionize all our thoughts, and gas will prove the most economical, convenient, and hygienic method of heating.

A Condensing Gas-Stove.

A week later "The London Times" published the following description of the new room-heating device: "In the condensing gas-stove referred to by Dr. Percy Wilde in his letter last week the fumes from the burnt gas rise into a flat, oblong tank, about 3 feet long, which forms the top of the stove. Thence they are conducted by four tubes, also about 3 feet long, down to a similar tank, which constitutes the base. This tank contains water and slaked lime, and the fumes, cooled by their circulation through the apparatus and by contact with the water, pass round to meet the hot fumes in the flue behind the burners. The result is rapid condensation, with production of a vacuum, which causes the draft necessary to draw air into the fire. The water of condensation absorbs the carbonic acid, and, trickling down into the bottom tank, combines with the lime, forming carbonate of lime, which, being insoluble, is precipitated. As the slaked lime is used up, the carbonic acid combines with the carbonate of lime to form bicarbonate, which is soluble, and the solution, when its amount becomes excessive through the constant additions of condensed water, is drawn off by a small tap. It is stated that 8 pounds of slaked lime will last 5 or 6 months before being dissolved with a fire consuming 8 or 10 cubic feet of gas an hour, and burning, say, 12 hours a day. Radiant heat is emitted from the burners, which are of the Bunsen type, heating asbestos strings, through a talc front, while the metal surfaces of the top tank and the pipes that lead to the bottom tank, the temperatures of which it is said do not exceed 100 deg. C., gently warm the air of the room by convection."

SETTING AND FITTING UP BOILERS.

By Phoenix.

Chapter IV.

Applying the Asbestos to Boiler and Fittings.

Ever have the asbestos swell up and bulge until the boiler presented the appearance of a kid with the mumps? Well, that's one on you for not being wise as to handling the "blamed stuff" as you call it. It works just as smooth as ten-year rye, if you know how to handle it.

This asbestos, well, you have read about it, probably, many times, and so I will not bother to relate its history. Will say, however, that it has a great future before it, as they say it is the only substance that fire is unable to consume.

The asbestos used for covering boilers and fittings should be purchased in 100-lb. sacks. That is the more economical manner of getting the material when desired for early application. In ordering, if you take the trouble to look in the boiler catalog, you will find the amount necessary for covering the boiler to be stated. A rather loose manner of estimating the necessary amount is to allow six pounds of asbestos for every square foot to be covered.

One of the principal reasons why there are so many "bum" jobs of covering the boiler is, the asbestos is not soaked in water long enough. It will not work properly unless it is in a pliable condition, and if one attempts to put on the asbestos when it is about the consistency of rather stiff clay, he will find out that it is a mistake. With every boiler there comes a good-sized box in which the trimmings, the doors, etc., are packed. Now, I always found that this box was an excellent thing to prepare the asbestos in (providing somebody had not hooked the box before I got ready to make use of it).

At any rate, get a box of some kind and empty into it all the asbestos for the job. If there are connections so that you can make use of the hose it will save carrying the water in pails. There are no proportions to be observed here. It's not so many sacks of asbestos and so many pails of water to each sack, but keep running in water until you can stir the mixture easily with a hoe or shovel. Then stir it up very thoroughly and run in a little more water. The next thing to do is to put on your coat and go home for supper, because this asbestos should be put to soak the last thing at night and should stand at least 12 hours before being applied. Two days will be better if you can give it the chance.

The next morning when you come on the job you will find that the asbestos "took up" the water amazingly and is rather too stiff to be applied, and more water is necessary before it works properly. That is, you will find this to be the case when you have learned to use the mixture in the proper manner.

In order to do a strictly first-class job, the boiler should be moderately hot when the mixture is being put on. I have never observed a first-class job put on a hot boiler in one coat. It may be done, possibly, in two coats, but the better way is to make a three-coat job of it. When I wrote some of this dope at a previous time some sucker sent in and intimated that I did not know my business, and that the asbestos could be slapped on in one coat. It can, in the summer-time and by using wire-netting or baled-hay wire to hold the mixture firm; but it will take a long time for the thing to dry out and, at that, you will never have as mechanical looking a job as is the case where more pains are taken and the three coats applied.

Many people consider that there is nothing to it to put on the asbestos, but I want to tell you that there is so much that in some places men do nothing but just this one thing and they have got it down mighty fine. Don't try to cover the entire surface with the first coat. Throw it on in small dabs and the wider they scatter the better. In order that they stick properly the asbestos will have to be pretty wet and the boiler quite hot, at this application. Now get busy at something else for awhile and let this first coat get dried on thoroughly. A few of these little dabs of asbestos are going to come off, but not enough to queer the job.

The second coat may be applied with a trowel. Some parties use the hand, only, slapping the mixture on in any old way and get a lop-sided effect and an uneven thickness of covering. As you proceed to spread on this second coat, it will be found that steam is generated and, if no means are provided for its escape, the covering will bulge badly in places and some of it probably fall off. This may be prevented by making slits in the covering with your trowel before the asbestos is dry. A little experience will teach you just the proper time to put in these cuts for the escape of the steam. The second coat should be the thickest and should cover the entire boiler wherever it is designed so to do. It should also bring out the general form of the boiler, so that, when the last coat is put on, it need not be over half an inch or so in thickness.

The last coat applied should contain some good Portland cement. Make it in the proportion of three of asbestos to one of cement. Now if, when the last coat is on and all dried out, there should happen to be some few cracks, you can fill them in by using some very thin asbestos and brushing it in with a white-wash brush; or you can paint the entire surface with paint containing a good body of lead. The same method will apply to the covering of the fittings, when it is designed to make use of this manner of covering.

From the foregoing description it can be seen that it is no mean job to cover a boiler and do a good job. The man who says, "Oh, Hades, that's all bunk. I can do the job all good enough in two hours," is just the "son of a gun" who has turned out so many unsatisfactory covering jobs. I have been on this fellow's trail for something like twenty years and in this time I would hardly dare estimate the number of boilers that I have covered over after him.

PUTS NEW TIPS ON OUR WINGS.

Editor "Domestic Engineering":—We thank you for your letter of the 17th and are glad that we shall be able to secure reprints of the article entitled "Walk in the Light, but Keept Out of that Flame."

The writer's personal opinion of your cost propositions is that they are "great." It is just such a line of talk that the business men of this country need today.

You have educated them on what items should be considered in figuring the cost, and your strong articles, following up the initial educational work, should accomplish a great deal of good.

Hoping that you will have the fullest measure of success, I remain,

Thos. A. Fernley, Secretary,
National Association of Jobbers of Plumbing Supplies.

THE JOURNEYMAN AND HIS HELPER

JOIN HANDS FOR BETTER WORK

MELTING-POT PHILOSOPHY.

Editor "Domestic Engineering":—Bein' Congress is again at work and Hans Wagner has been induced to sign up for 1911, I guess I'll just slip over a few remarks about things in general.

My! but don't these days and weeks and fortnights and months just whiz along though? Why, it don't seem no time at all since we were all climbin' onto the water wagon and lookin' at the naked bodies on the front covers, but here we are in the "fifth moon." Think of it! almost half way through. More than four months, or 33⅓ percent of the whole year gone by already, and what have we done with all that time?

As for me, I'll own up to accomplishin' nothin' at all more than earnin' and collectin' my little so much per. And I guess that will about cover the doin's of most of you boys, and lots of other folks besides.

Do you know, fellows, it looks to me as if those two little words—earnin' and collectin'—describe the jobs that keep most everybody busy nowadays? Leastways, a good big chunk of most folks' time goes into one or t'other of those vocations.

With you men, as with me, we do both earnin' and collectin', and most of us are glad of the chance to dispose of our time and energy in exchange for coin of the realm on which to subsist and are satisfied to go thus through life.

But have you ever thought of this—while an earner of wages is always a collector, inasmuch as he usually collects what he earns, a collector is not by any manner or means always an earner?

And to my humble way of thinkin' it is this one little fact more than any other that makes these months and years slide by in the lives of so many of us, leavin' only impressions of havin' earned and collected, earned and collected. "This much and nothin' more."

But at that, life is a great thing even as it is lived today, and it seems to be worth the price to most of us. I'm not sayin' things can't and won't be improved, for I believe they can and will. Reciprocity might help, who knows? President Taft thinks it will and so does Mr. Hill—and Mr. Hill ought to know, you know.

But, then, most any of us can name a few things that would make life more worth while. But namin' things is an easy job. It's what we do that counts.

To illustrate—one thing a few more of you journeymen and helpers could do which wouldn't do any harm is this: Take a pen or a pencil or a quill or a spike in your fist and write, scribble or draw pictures of your thoughts, deductions, aspirations, feelin's, theories, desires, hopes or regrets for this department and the edification of the readers thereof. What!

Well, bein' that ain't what I set out to nag about, we'll let it go at that. What I started out to do was to harangue a few myself, so here goes:

When I just now plucked the pen from behind my ear preparatory to lettin' you fellows in on a real philosophical "flight of fancy and flow of soul" I just happened to be glancin' through the pages of a copy of this journal bearin' a recent date in which I find the following:

1. In your experience as a journeyman you have naturally had a chance to apply for positions at your trade at different times. Probably you have done this in several different cities and states. Now what are three of the most common mistakes the average journeyman makes right off the reel, as soon as he steps into the shop and makes himself known to the boss? He's just hitting for the job, remember.

2. After one had secured a job with a new firm, what are the three most important points to be considered, in your estimation?

3. We have observed a statement something like this not many months ago: "The people in the hardware business, who are running plumbing and steam-heating in connection with the same, do not employ as good mechanics as the regular plumbing shops." What has been your experience and observation along this line? Would you work for a hardware firm? If not, why not? Please state the reasons for your position on this question.

(Now you know answerin' questions ain't my specialty, and if I do butt in this once I'm not intendin' to do it again, unless it will be to keep a nice respectable bunch like the above from gettin' the go-by entirely.)

But honest, now, don't that list of three look like it ought to have **somethin'** done to it?

"In your experience as a journeyman you have naturally had a chance to apply for positions—"

Well, I guess you **have,** all right, all right! You have not only had the **chance,** but perhaps have felt the stern **necessity** of rustlin' around at different times to cop a job. And of course you know that many sad mistakes have been made in strikin' for jobs. Most everybody makes them. Some make more than others, but most all of us have made a few.

One mistake, which seems to me to be the most common, is made before the journeyman goes into the shop at all. It's mostly made in some nearby grog-shop, and consists of takin' a few drinks as courage bracers before facin' the strange boss in a strange land.

Now there is nothin' that I know of that goes so much against the grain of most bosses as bein' confronted and entertained by a strange journeyman with a boozy breath. I've known that mistake alone to cause many a good mechanic to be turned down flat. I have seen a few men make the mistake of spittin' tobacco juice all over the place while talkin' to the boss and I recall one in particular who lost his chance to get into a good shop by blowin' a puff of cigar smoke into the boss' face. This particular boss was used to havin' hay fever every summer and right then was sufferin' from a bad attack, and when the fumes from that perfecto came waftin' past his nose he goes off into a coughin' spell that shook the mantles off the gas fixtures and fairly made the windows rattle. Course after that Mr. Journeyman had no more chance of landin' that job than he'd had holdin' the hand of a Siwash squaw without gettin' the itch.

The next most common mistake is kinder hard to name.

There seems to be several in most the same class. Some men make the mistake of talkin' too much, and some don't say enough. I think you are more apt to say too much than not enough.

Lots of men start right in to chin about the last shop they were in and the short-comin's of the boss. That's generally a bad way to start. It gives the boss the hunch that you are mouthy, and no boss likes to take on a man who shoots off his bassoo about the shop. It ain't a good plan to brag about the amount of work you can do in a day either. Course lots of bosses like to get hold of work-horse mechanics, but most of them prefer men with the name of doin' good thorough work.

If you're a first-class experienced journeyman, that's about all you need to tell the boss. He'll judge from your talk and appearance if you're the kind of man he is lookin' for, and most likely will tell you to come around again at noon. In the meantime he'll call up the shop you worked in last and find out the rest. So when you show up again he's ready to take you on or turn you off.

If you don't happen to be a strictly first-class man, don't make the mistake of representin' yourself as such, just tell the boss exactly what you can do and let it go at that.

If you are "hittin' the road" for a job—goin' from town to town—you should have a letter from your last boss at least to show you made good with him.

It don't do any harm to "rag up" a little when you go out lookin' for a job nowadays. I recall the time, though, when a fried shirt or a new hat was a perfect "jonah." A mechanic wasn't supposed to be a dude in those days, and if he showed up lookin' for a job in anything but his workin' togs, they'd make him wipe a lump or two right on the spot to see if he was the real thing, and when they found out he was the boys in the shop would take him out the back way to "wet the togs" and most likely "touch" him for all he'd stand besides. But it's different now. Everybody wears better clothes nowadays, and if you can't sport a pretty fair front you're apt to be listed as a bum before you get a chance to explain that you ain't.

Now, supposing' you have landed a job in a new shop and show up next day to go to work. The editor wants to know the three most important points to be considered then.

While there are a great many points a journeyman ought to consider in going into a new shop, and while these points might vary somewhat accordin' to the different circumstances in the different shops, and as the editor only wants the three most important, it looks to me as if the followin' trio should be the first to consider and adhere to:

First—Be at the shop or at the job ready to start to work at eight o'clock. Don't get there on time Mondays, Wednesdays and Fridays, but get there on time every day.

Second—Get next to the general way that particular shop conducts its business and fall in line. Keep step; make yourself fit in, you know.

Third—Ruffle your face up into a smile and keep it always so ruffled.

And now, boys, we come up slam-bang against that "hardware question," and I'll tell you right now it's a hard one to tackle from my point of view. I had almost rather have nothin' whatever to offer on that lay-out. Course, I have got my opinion, but I have never yet worked in a "hardware shop" it wouldn't be quite fair to give it here. Still, I think it's a good question, and I would much like to see it taken up by those of you journeymen who are in a position to know more about it than I do.

And now bein' Congress has still some more work to do, it's my cue to shut up. So I'm shut.

A. A.

SOME HINTS FOR THE HELPER.

First: In starting the threading tool upon the pipe it will help the matter if you place a drop or two of lard oil upon the pipe. With a good make of tool it is not necessary to use the strength of a Sandow to start the tool on the pipe. It should "catch" easily if it is going to "catch" at all. In case that you are using solid dies and a three-wheel pipe-cutter, it is well to remove the raised rim around the pipe that the cutter will produce. Some do this by using a cold chisel and hammer, while others simply flatten down the rim with a hammer. About the quickest and most satisfactory way we have found is to make use of a blacksmith's rasp, which will do the job in short order, leaving the pipe in good condition to receive the die.

Second: In starting the three-wheel cutter on the pipe, be sure that you start it straight and that the wheels track properly. If the wheels are on the bum, put in some new ones and see to it that the pins are not worn partly out, as the latter point would make even new wheels run out of true.

Third: Never use a pipe-wrench on the radiator-valve nor upon any brass or nickel-work, as it will leave the prints of the jaws upon the valve or the pipe. For the valve use a monkey-wrench and for the pipes a special wrench for nickel-plated pipe should be obtained.

SOME QUESTIONS FOR THE HELPER.

We have been greatly pleased with the success of this department, which has been coming along in fine shape for the last several numbers. We have noticed, however, that there have been but few letters from the helper and we desire to see if it is not possible to get some. So we are going to ask some questions this time that will relate to the helper only. We shall look for the answers soon and we hope most sincerely that we shall not have to look in vain. We can fix up the copy if it is not in exact shipshape, and you take it from one who knows, there is but mighty little copy that comes to any editorial room but what has to be "edited," so, faint heart, brace up and sling in the dope. Well, now we are ready for the questions and here they are:

1. Tell us about the best journeyman you ever worked under. What did he put you next to? Did you have to do most of the work?

2. As a direct contrast, tell us a bit about the very meanest mechanic that you ever had to boss you. Don't bear down too heavy on the meanness, but dwell rather on the mistakes that he made and write the answer to this second question in that spirit rather than with the idea of throwing mud.

3. If you have ever read any books relating to the craft and business, tell us what the names of them are and mention the one that really helped you the most.

4. What chapter in this particular book did you the most good?

OBITUARY.

John Tierney.

Providence, R. I.—John Tierney, a member of the plumbing firm of P. and J. Tierney of this city, was almost instantly killed in an automobile accident at East Greenwich on April 24th. Mr. Tierney was 24 years of age and unmarried.

QUESTIONS AND ANSWERS

TO ASCERTAIN THE NUMBER OF FEET IN A RADIATOR.

Editor "Domestic Engineering":—When I was at a considerable distance from the shop and had no radiator catalog with me, I wanted to figure out the size of a couple of radiators and had forgotten the number of feet per loop that they carried. It involved my going a couple of blocks and calling up the shop and getting the girl to hunt for the catalog, and then more time to find the right place and tell me. Now, I have thought that perhaps you might know some table or rule that you could print that would help a man out in such a case as this, and if there is any, I very much wish that you would print the same. M. N.

There has been a rule published which gives very nearly the amount of radiation, as follows: "Divide the product of the section height in inches and the number of columns by the constant 20 to obtain the number of square feet of heating surface of the section." To find out how many feet of radiation there are in a 10-section, three-column radiator 38 in. high, one would go about it in this manner:

Three times 32 (the section height) would give 96, which divided by 20 would equal 4.8, and multiplying by 10 (the number of sections in the radiator) we would have 48 ft.

It is stated that this result would be slightly in excess of the true amount, which the manufacturers rate at 4 to 4.5 per section. A fitter, however, who had had some experience with the rule and radiators generally, should be able to hit the nail pretty closely on the head.

AMOUNT OF INDIRECT RADIATION ON ONE PIPE.

Editor "Domestic Engineering":—Last fall I had occasion to put in some indirects in a residence that I was heating and the fitter, thinking to save some pipe and trouble, connected up some of the indirects to one run of pipe. Now there are sets of 100 ft. each that are connected to one pipe and I am satisfied that they are not giving the results that they should. In your experience about what is the greatest number of feet of indirect radiation that can be placed on one pipe?

"Indirects."

This would be a matter of estimating the capacity of the pipe to supply the radiation which was put on it, and making the allowance for the various turns that the pipe was given before it reached the radiators. While we have observed more radiation put on one pipe than that we shall mention, we are bound to say that the amount we give is quite safe if the fitter has his pipe sizes right. We would prefer not to see more than 100 ft. on one pipe, and would like 80 to 90 better. Perhaps your radiators are not high enough above the water line; see to it that they are some two feet above. If you have a number of these stacks to run, put them in groups and run a main line, from which you can take branches to the different radiators.

RANGE BOILER DOES NOT HEAT PROPERLY.

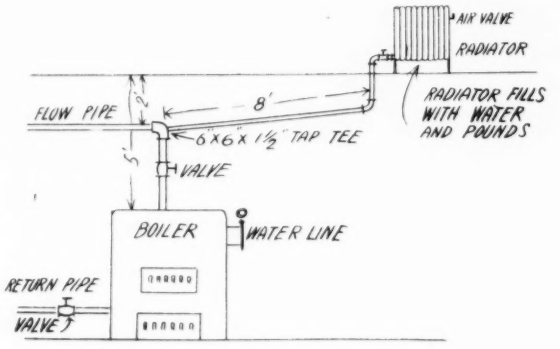
Editor "Domestic Engineering":—I have a stove heater and hot-water boiler in the basement of my residence and, as the height was limited at the place where the boiler was set, the plumber did not use the regular stand for the boiler, but set it much lower. We have never been able to get the boiler entirely hot and thus do not get the amount of hot water that I feel that we should. If the boiler had been set higher, would it in your opinion have given better results?

"Reader, Sometimes."

Assuming that the rest of the job is piped as it should be, and that the sizes of the heater and the boiler are proportionally correct, we believe the lowering of the boiler has had the effect that you mention. There must be some means of hanging the boiler from the ceiling so that it would be all above the heater. We believe you would then find that the tank would heat most easily and that you would have all the hot water needed. Such a job would not be very expensive and would well repay the trouble and money laid out.

A STEAM JOB THAT DOES NOT WORK RIGHT.

Editor "Domestic Engineering":—I have a steam job that is not working just right. A radiator is just over the boiler-room on the first floor. I run the feed-pipe



A Steam Job That Does Not Work Right.

from a taper-ell, 6x6x½, from the top of boiler as shown in sketch. The trouble I have is that the radiator fills with water and will not heat. Would like to hear what your readers think of it.

Raton, New Mexico. J. McCabe.

How He Counted Them.

"How many children have you?" asked the census-taker of a Hibernian living in the lower part of New York City.

The man addressed removed the pipe from his mouth, scratched his head, thought it over a moment, and then replied:

"Five—four living and one married."

"Domestic Engineering" Cartoon on "The Cut-Price Shell-Game."—No. XXXVII.

I FEEL SURE YOU GENTLEMEN ARE SMART ENOUGH TO FIND THE PEA OF PROFIT
CUT-PRICE CONTRACT
ASIDE BUSINESS IS PICKING UP. ALL THE SUCKERS ARE BITING
I KNOW HOW
WATCH ME DO IT
PLEASE LET ME TRY
LOOKS EASY
I'LL BET $10 I KNOW WHICH SHELL ITS UNDER
I HATE TO TAKE IT AWAY FROM HIM
"DOMESTIC ENGINEERING"

Odds 10,000 to 1 in Favor of the Bookmaker.

As a Plain Sporting Proposition and from Past Experience, How Much are You Willing to Bet That Any One of These Gentlemen Find The Pea of Profit?

If you want to possess a special proof of this or any other of our cartoons, let us have your request at once. We have many applications for our cartoons for framing and want to take good care of all demands made.

WILL DOUBLE ITS PLANT'S CAPACITY.

The Enameled Tank Co., Kalamazoo, Mich., is building additional furnaces at its plant in that city, with which it is expected that its capacity will be doubled.

THE STEWART TANK & MFG. CO. BEGINS OPERATION.

The wheels are turning in the new plant of the Stewart Tank & Mfg. Co., at Euclid Ave. and 117th St., Cleveland, O. This company is getting out a complete line of low-down water-closet tanks that are to be equipped with the Stewart loose-ball flush-valve. J. W. Walker of Cleveland is the president of this new corporation. W. G. Stewart, who is secretary of the concern, will start on his first trip in the trade on May 15th.

CHANGES IN THE McCRUM-HOWELL CO.

At a meeting of the executive committee of the McCrum-Howell Co., held April 24th at its general offices in New York City, Howard T. Gates was appointed general sales-manager, and Ernest E. Bell eastern sales-manager of this company. A. H. Schroth was appointed Western sales-manager, January 1, 1911. The resignation of George L. Greenman, as assistant sales-manager, was accepted, that he might assume the larger duties of eastern general-manager of the Richmond Sales Co. The changes went into effect immediately.

PERSONAL MENTION.

Fred B. Mueller, of the H. Mueller Mfg. Co., widely known among the water, gas and plumbing men, is confined to St. Mary's Hospital, in his home town, Decatur, Ill., as the result of an operation performed on April 21st. It is not expected that Mr. Mueller will be able to leave the hospital before the last of May. The operation which he underwent was not necessarily a dangerous one, but it was of a very painful character. Fortunately Mr. Mueller was in admirable health when he submitted to the operation, and this greatly lessened whatever danger may have attended. It is expected that the operation will permanently relieve him from an annoying ailment which has given him much discomfort in recent years.

EASTERN TRADE GOLF ASSOCIATION INVITED TO CHICAGO.

The Western Trade Golf Association has extended an invitation to the Eastern Trade Golf Association to be its guests at a special tournament to be held at the Calumet Country Club in Chicago on May 31st, at the time of the convention of the National Association of Master Steam and Hot Water Fitters. This invitation is also extended to any golfers in the trade who are in attendance at the convention. The Calumet Country Club is only 20 minutes from the hotel and theater district, and it is hoped that a large number of guests will bring their sticks with them and plan to play golf at this meet. It is also reported, though this, as yet, cannot be confirmed, that a picked team of the Western Trade Golf Association will challenge a team of the Eastern Trade Golf Association to play a match in Detroit at the mid-summer meeting of the Central and Eastern Supply Associations.

JENKINS BROS. MOVE MAIN OFFICE.

The firm of Jenkins Bros., New York City, has been doing business for 30 years at 71 John St. At last it has been affected by the May 1st wave, which generally starts about February, and on April 17 a move was made from the old building to commodious quarters at 80 White St., between Broadway and Lafayette. Jenkins Bros. has entirely outgrown the accommodations afforded by the old building, and the new building affords increased facilities, which will enable the company to serve its customers better. Everybody interested in valves should write to Jenkins Bros. for their later literature on their products.

WILL HEREAFTER MARKET THE BUNDY STEAM-TRAP.

The Nashua Machine Co., Nashua, N. H., announces that it has purchased the Bundy steam-trap business of the American Radiator Co., of Chicago. The Bundy steam-trap has always been manufactured by the Nashua company, but it has been marketed through selling arrangements, formerly with the A. A. Griffing Iron Co., and later through the American Radiator Co. The change went into effect May 1, and this product is now sold through the Nashua company's own selling department, which is located at 127 Federal St., Boston. John Sabin, the first to introduce a tilting trap on the market, more than 20 years ago, will have charge of this department as sales manager.

SAN FRANCISCO JOBBERS ESTABLISH BRANCH HOUSES.

As a result of the discriminatory railroad rates that San Francisco jobbers are compelled to contend with in going after business in the interior parts of the state, several of the local houses have been compelled to establish branch houses in various distributing points and in places where a few years ago there seemed no necessity for such action. Prominent among the houses that have been branching out in this fashion of late has been the Pacific Hardware & Steel Co. This big supply house is now preparing to enter the field at Sacramento, a man having been there for some time looking over the ground in search of a suitable location. This action was not decided upon as a matter of choice but solely as a result of the advantageous freight rates granted to the interior cities. It is but a short time ago since this firm was compelled to open warehouses at Los Angeles and Portland, and it was felt at that time that no further expansion along this line would be necessary. Other supply houses have also branched out in this fashion, notably the Crane Co., which now has branches at Sacramento, Oakland and at a number of interior points along the Coast.

GOOD SIDE-LINE FOR PLUMBERS.

The Standard Sanitary Mfg. Co., Pittsburgh, Pa., will mail upon request its recently issued leaflet on a special galvanized-wire sink-mat, which should prove to be a profitable side-line for all plumbers. This mat protects the enameled surface from the scratching and marring caused by repeatedly placing heavy pots, kettles and other kitchen utensils thereon. The mat acts as a drainboard, does not interfere with the drainage, and should appeal to every housewife. It is made of galvanized-wire, reinforced at

the corners and around the edges, and is provided with rubber pads which keep the metal from touching the enamel at any point. It is clean, sanitary and rust-proof. The mat can be obtained in any size desired. If you are interested, write the company for the leaflet, mentioning "Domestic Engineering."

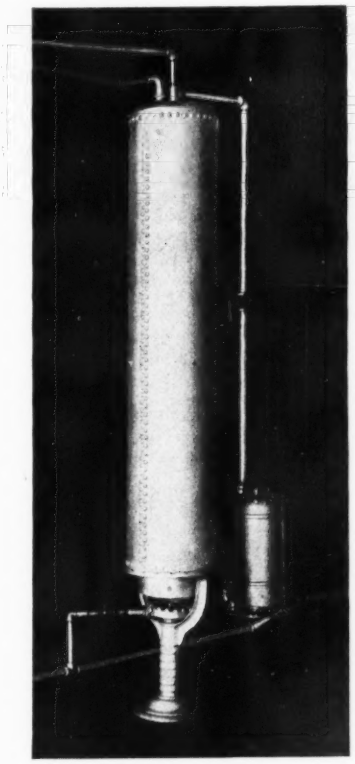
THE WARREN WATER HEATER CO., MINNEAPOLIS, MINN.

The Warren Water Heater Co. has recently been incorporated at Minneapolis, Minn., the capitalization being $25,000. The headquarters are at 435 Andrus Building, and the officials of the company feel sure that the future prospects for the enterprise are very bright. Many inquiries have been received from jobbers and plumbers in all parts of the United States and even as far away as Honolulu.

The officers of the company are: President, F. L. King; vice-president, S. S. Bright; secretary and treasurer, L. H. Clawson.

A number of shipments of heaters have been made to some of the very best plumbing concerns in the country, special points of consignment being Los Angeles, Boston and Duluth, showing the extent of the company's territory.

The "Undertank" heater is attached immediately under the tank, and can be applied to any common boiler-stand. In



The "Undertank" Heater Attached.

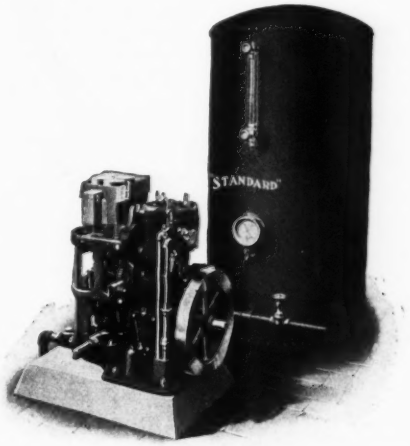
the illustration shown, the unobservant might miss the fact that the Warren heater is there, as the "Undertank" and a side-heater are installed on the same boiler. Beneath the boiler, however, will be noticed the "Undertank" apparatus, which occupies a very small space.

The circulation is obtained by a patented circulating pipe-connection, which is divided into two sections, providing a downward flow for the cold water and an upward flow for the hot water in the same pipe. The circulation is obtained in a very effective manner by this device. A recent test made on the Undertank heater, with the initial temperature of the water at 40 deg. resulted in a showing of a top temperature with the "Undertank" attached of 152 deg. and a bottom temperature of 101 deg., after the gas had run one hour. This test was made in comparison with a side-heater under the same conditions, with a resultant temperature of 146 deg. and 46 deg., respectively. Enough cold water was then drawn to supply an ordinary bath, and after resuming heating for 30 minutes, the "Undertank" heater still showed an advantage of 7 deg. in temperature.

The manufacturers claim to deliver hot water in three minutes with this apparatus. Its simplicity will be noticed by the reader, and further information and circulars can be obtained from the company.

"STANDARD" WATER-SUPPLY SYSTEMS.

The Standard Pump & Engine Co., Cleveland, O., is distributing to the trade an eight-page pamphlet describing "Standard" water-supply systems for suburban homes, greenhouses, truck farms, hospitals, infirmaries, etc. The chief features of these systems are the "Standard" pumps,



The "Standard Jr." Pump with Complete System.

which are operated by gas or gasoline engines, motors, or hand power. The hand-pump system has a capacity of 240 gal. per hour, with 40-lb. pressure. The "Standard" 5-h. p. deep-well pump, with electric motor, reaches a capacity of 4,000 gal. per hour, with 90-lb. pressure. One of the favored types is the "Standard Jr.," which is furnished in the suction-lift or the deep-well type, has an engine capacity of 2-h. p., a water capacity of 400 gal. per hour, and with any pressure up to 90 lb. These machines are compact and are in satisfactory use in many parts of the country, being specially desirable for small water-supply systems in country homes. Copy of the pamphlet can be obtained upon application to the company, and also any additional information that may be required for special installations. When you write, mention "Domestic Engineering."

TRADE LITERATURE RECEIVED THIS WEEK.

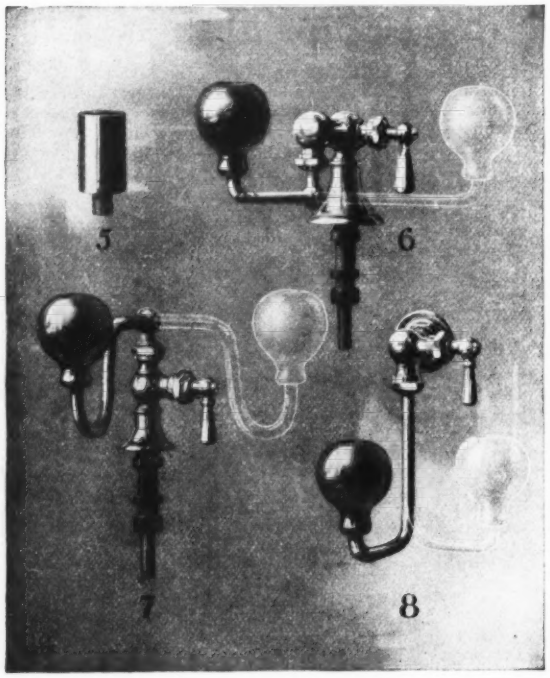
The Joseph Dixon Crucible Co., Jersey City, N. J., has just published a very neat folder entitled, "Maintenance Painting for Electric Railways." It gives excellent photographs of street railway viaducts, power plant stacks and car trucks painted with Dixon's silica-graphite paint.

The folder explains in a very interesting way the special adaptability of this paint for street railway uses, and the paint department will be glad to send copies to any one interested in economic railway maintenance.

The Gurney Heater Mfg. Co., Franklin and Pearl streets, Boston, Mass., will mail to you one of its advertising hangers, which illustrates the Gurney heater in black and white against a deep black background embellished by red-letter trimmings. This hanger is designed to catch the eye of the customer and arouse interest. If you are interested in selling heaters, and the Gurney heater in particular, you can obtain the hanger upon request to the Gurney Heater Mfg. Co. Tell them you saw this notice in "Domestic Engineering."

SANITARY DRINKING FOUNTAINS.

Many laws have been passed or are in contemplation, for doing away with old-fashioned public drinking devices. The plumbing-supply concerns have been watching the growth of this sanitary movement with keen interest, and, with their usual up-to-dateness, have brought into being different types of sanitary drinking devices. They



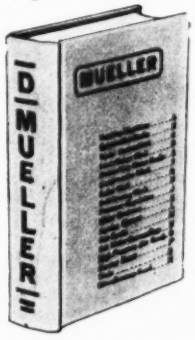
Sanitary Drinking Fountains.

have been stamped with the approval of the public and the sanitarians. The Rundle-Spence Manufacturing Co., Milwaukee, Wis., has shown its keen appreciation of the importance of public sentiment by the issuance of a 32-page booklet, devoted entirely to its sanitary drinking fountains in different styles, suited to various public conditions. The illustration shows four of the company's brass bubbling heads. Fig. 5 is a light pattern bubbling head. Fig. 6 presented a swinging type of head, made to fit through the slab on lavatory work. It is opened or closed by handle, and made to swing to one side as shown. Any horizontal length desired can be obtained. Fig. 7 is another pattern of the same construction. Fig. 8 is also a swinging type bubbling head, made to fit in sink having a cock-hole in the back. These bubbling heads can be furnished in self-closing form if required. The catalog illustrates and describes also fountains with vitreous china bowls in many applications, and in single and multiple form.

Plumbers who are watching closely for opportunities for further development of their business will derive special advantage by possessing a copy of this latest booklet on this subject. Copy of it can be obtained by application to the Rundle-Spence Mfg. Co., Milwaukee. Mention "Domestic Engineering" when writing.

THE MUELLER CATALOG A LA JACK HORNER.

Everybody has heard of the historic Jack Horner, who "put in his thumb and pulled out a plum," using his success to emphasize his angelic disposition. Perhaps plumbers can emulate Jack Horner when they use the magnificent catalog recently issued by the H. Mueller Mfg. Co., Decatur, Ill. That's all there is to it. "Put in your thumb and pull out any plum" of Mueller supplies that you desire. It is the best thing in catalogs that we have seen, and you can't believe what we say unless you have a copy yourself. To describe it briefly, we will state that it has an alphabetical index for every conceivable line of supplies used by the trade, and the volume itself is divided into alphabetical sections. If you are considering the selection of bath-cock supply-connections, the index tells you to look in R 11. All one has to do is to put his thumb on the black-leather tab marked R and look for page 11 in that section, and all the Mueller supply-connections are unfolded to the prospective purchaser. The company is to be congratulated on its enterprise, and the



The Mueller Catalog D.

trade on its acquisition. We don't know how many of these catalogs have been printed, but we would advise every reader of this notice to "get there" quick and catch hold of a good thing while it is available. Mention "Domestic Engineering" when you apply for it, and it may give you a stand-in. The illustrations and descriptive matter are clear and concise and all specifications and prices are inserted for every line of supplies. It would surprise every one to note the different lines placed on the market with which he is not conversant. Our advice is, "Go to it!"

GOVERNMENT CONTRACTS TO BE AWARDED.

Supervision Architect James Knox Taylor, Treasury Department, Washington, D. C., will receive sealed proposals as follows:

Until 3 p. m., May 29, 1911, for the construction complete, including plumbing, gas-piping, heating apparatus, electric conduits and wiring, of the U. S. post-office at Dyersburg, Tenn.

Until 3 p. m., May 31, 1911, for the construction complete, including plumbing, gas-piping, heating apparatus, electric conduits and wiring, of the U. S. post-office at Sulphur Springs, Tex.

Until 3 p. m., June 5, 1911, for the construction complete, including plumbing, gas-piping, heating apparatus, electric conduits and wiring and lighting fixtures, of the U. S. post-office at Dublin, Ga.

Until 3 p. m., June 6, 1911, for the construction, completé, including plumbing, gas-piping, heating apparatus, electric conduits and wiring, of the U. S. post-office at Wichita Falls, Tex.

Until 3 p. m., June 7, 1911, for the extension, remodeling, etc., including plumbing, gas-piping, heating apparatus, electric conduits, wiring system and lighting fixtures, of the U. S. post-office and court-house at Wilmington, Del.

All proposals should be in accordance with drawings and specifications, copies of which may be obtained from the custodians of the above sites or from the office of the Supervising Architect at Washington, D. C.

WERE BURNED OUT IN THE BANGOR FIRE.

In the great fire which destroyed the larger part of the business section of Bangor, Me., covering an area two miles long and half a mile wide, and destroying property valued at $6,000,000, the following plumbing and heating concerns were burned out: The Fairbanks Co., dealers in plumbing supplies; Noyes & Nutter, dealers in heating supplies; C. H. Babb & Co. and Clement, Carter & Co., plumbing and heating contractors.

Toledo, O.—Frank Miller has incorporated his business under the name of the Frank Miller Plumbing & Heating Co., with a capital of $10,000.

May 9, 1911.—The 10th annual convention of the New Jersey State Association of Master Plumbers will be held at the Union Hill Turn Hall, corner of Lewis St. and New York Ave., Union Hill, N. J. The convention will open at 10 a. m. The officers of the association are: President, George S. O'Neil, Paterson; secretary, H. F. Baillet, 191 Clinton Ave., Newark, N. J.

May 10, 1911.—The annual convention of the Massachusetts State Association of Master Plumbers, in Boston. The officers of the association are: President, John F. Cabeen, Salem, Mass.; vice-president, John E. Holland, Brockton, Mass.; recording and financial secretary, John P. Drury, 99 Endicott St., Boston; treasurer, O. S. Kendall, Worcester, Mass.

May 16, 1911.—Annual meeting of the West Virginia State Association of Master Plumbers, at Morgantown, W. Va. The officers of the association are: President, E. C. Wiedebusch, Morgantown; secretary, L. W. Joseph, Morgantown.

May 22, 1911.—The annual convention of the Tennessee State Association of Master Plumbers at Nashville. The officers of the state association are: President, J. W. Martin, Chattanooga; secretary-treasurer, R. O. Carlin, 816 Georgia Ave., Chattanooga.

May 29 and 30, 1911.—The 14th annual convention of the Colorado Master Plumbers' Association, at Denver, Colo. This association is composed of master plumbers in Colorado, New Mexico, Utah and Wyoming and its officers are: President, Chris Irving, Denver, Colo.; vice-president, Henry Green, Salt Lake City; treasurer, Peter E. Snow, Denver; secretary, Chas. A. Dehn, 414 Chamber of Commerce Bldg., Denver, Colo.

May 29, 30, 31 and June 1, 1911.—The 23rd annual convention of the National Association of Master Steam and Hot-Water Fitters, at Hotel Sherman, Chicago. The officers of the association are: President, Charles A. Geoghegan, New York City; vice-president, Edward B. Denny, Newark, N. J.; treasurer, Juan A. Almirall, New York City; secretary, Henry B. Gombers, 260 West Broadway, New York City.

June 6, 7 and 8, 1911.—Third annual meeting of the National District Heating Association, at Pittsburgh, Pa., headquarters Fort Pitt Hotel. The officers of the association are: President, Geo. W. Wright, Baltimore, Md.; first vice-president, A. D. Spencer, Detroit, Mich.; second vice-president, W. J. Grams, Seattle, Wash.; third vice-president, Warren Partridge, Springfield, Ill.; secretary-treasurer, D. L. Gaskill, Greenville, O.

June 9 and 10, 1911.—Annual convention of the Associated Master Plumbers of Texas, at Galveston. Headquarters will be established at the Tremont Hotel and and the convention sessions will be held in the Scottish Rite Cathedral. The convention will open at 9 a. m. June 9th. The officers of the association are: President, Joseph Netzer, Laredo; vice-president, J. P. Sheehan, Dallas; secretary, J. C. Netzer, Laredo; treasurer, N. S. Hill, Waco.

June 13, 14 and 15, 1911.—The 29th annual convention of the National Association of Master Plumbers of the United States, at Galveston, Tex., with headquarters at the Tremont Hotel. The officers of the association are: President, A. Selden Walker, East Orange, N. J., vice-president, Alfred C. Eynon, Canton, O.; secretary, Samuel F. Wilson, East Orange, N. J.; treasurer, Wm. McCoach, Philadelphia, Pa.

Chicago, Ill.—Patrick & Smith Plumbing Co. has been incorporated with a capital of $2,500. The incorporators are Fred Smith, Robert Patrick and Neal B. Mack.

Kankakee, Ill.—The Kankakee Plumbing & Heating Co. has started in business at 248 Court St. The firm is composed of Fred Himmer and J. H. Taft.

ALL BUSY ARRANGING FOR THE GREAT GALVESTON CONVENTION.

The "big four" Galveston master plumbers shown in the accompanying photograph are at the head of the general arrangement committee for the 29th annual convention of the National Association of Master Plumbers, which is to be held in Galveston, Tex., June 13, 14 and 15, 1911. They are busy men these days, and they report that all the necessary arrangements for the great event are progressing nicely. From left to right they are: W. H. Schutte and C. H. Diercks, both standing;

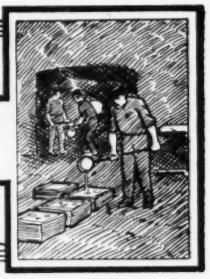
Galveston Master Plumbers Who Are Leaving No Stone Unturned to Make the Coming Convention of the National Association of Master Plumbers a Great Success.

and Geo. E. Robinson and Paul J. Medley, sitting. Mr. Robinson is chairman of the arrangement and souvenir committees, Mr. Schutte is chairman of the finance committee, and Mr. Diercks is chairman of the committee on Convention Hall, Exhibits and Hotel Headquarters.

ANNUAL CONVENTION OF THE WASHINGTON STATE ASSOCIATION OF MASTER PLUMBERS.

The annual meeting of the Washington State Association of Master Plumbers occurred April 21st and 22d, the sessions being held in the Tacoma Hotel, Tacoma. There was a good attendance and much interest shown. The election of officers resulted as follows: President, M. Isbister, Spokane; vice-president, P. J. Lavan; treasurer, E. V. Lambert, Spokane. Under the new plan, the secretary and executive committee are not elected by the association, but appointed by the president. President Isbister chose as secretary J. F. Meagher, Spokane, and for the executive committee A. E. Ayers and P. J. Lavan, Seattle; J. Griggs, Tacoma; C. A. Healey and W. W. Strong, Everett; Jas. Smyth, Spokane; W. A. Bell, North Yakima. The convention closed on Saturday night with a most delightful banquet at the Tacoma Hotel. A fuller report of the proceedings will appear in our next issue.

THE METAL MARKET



PIG-IRON EASIER.

The production of iron is falling off. In the steel-making irons, the Carnegie Steel Co. blew out four of its stacks last week. Several merchant furnaces have gone out, although two in the Mahoney Valley have started up. The steel corporations' percentage of active furnaces is now back to 67. The reduction in the price of ore, while solving an important problem, has been discounted in the price of iron for several months. In the East there have been numerous orders for lots of 500 to 1,000 tons, but no large orders or inquiries have been received. Eastern furnace interests are speculating on the prices that will be bid after the opening of the canal navigation May 15th, when Buffalo iron will more directly compete with other Eastern irons. In Birmingham $11 is now the established quotation, not only for shipment iron but in contracts running throughout the year. It is expected that much new business for second-half delivery will be taken in the Chicago district within the next fortnight. Quotations are as follows:

No. 2 Southern foundry, Birmingham	$11.00
No. 1 Northern foundry, New York	$15.75 to 16.00
No. 2X Northern foundry, New York	15.25 to 15.75
No. 2 plain, Northern foundry, New York	15.00 to 15.25
No. 2 Northern foundry, Chicago	15.00 to 15.50

IMPORTANT TRANSACTIONS IN COPPER.

Probably more copper has been sold in the last month than at any similar period in over six months. Consumers of all kinds came into the market and bought at low figures. Some sales were made by dealers at 11.92½ cents New York for electrolytic. This is a new low record, but the buying movement then started and sales were made during the week at advancing quotations. The market closed steady and fairly active at 12.12½ cents. The consumption of copper is large, but production is also large. The copper producers undoubtedly have stimulated much new consumption, which will continue even if prices are advanced two or three points, a condition unlikely for some time to come. European buyers are also taking copper in large quantities and shipments abroad will be large for the month of April. The market for Lake did not decline as much as that for electrolytic and the quotation for this grade is unchanged at 12.37½ cents.

OLD IRON.

Trade is exceedingly dull. Founders scrap is only being sold in small quantities and there seems to be no demand for steel scrap. From southern parts of the United States, as well as territory east of Boston, most of the scrap is going abroad, which in indicative of the low prices ruling here and the readjustment which has taken place in the steel trade in the last eighteen months when we were importing scrap from abroad. Quotations per gross ton in New York are as follows:

No. 1 yard wrought, long	$11.00 to $11.50
No. 1 yard wrought, short	9.50 to 10.00
Heavy-melting steel scrap	10.00 to 10.50
Machinery cast	11.00 to 11.50
Wrought pipes and tubes	10.00 to 10.50
Malleable castings	10.00 to 10.50
Wrought turnings	5.50 to 6.00
Cast borings	5.00 to 5.50
Stove plate	8.50 to 9.00
Light iron	5.00 to 5.50

TIN CONSUMPTION SMALLER.

The tin plate mills are not as active as last month and it is probable that there will be a sharp falling off in consumption unless new orders are received for tin plate. The market is strong, however, and sales were made at 42.50 cents.

SPELTER.

Quotations have again declined and spelter can be had in New York at 5.50 cents and in St. Louis at 5.30 cents.

LEAD.

The market is slightly lower and independent dealers are now selling at 4.42½ cents New York and 4.27½ St Louis. These prices, however, are for large lots.

NEW ENGLAND NOTES.

Massachusetts.

Somerville, Mass.—James F. Blute, a local master plumber and father of seven children, died at the Somerville hospital, of injuries sustained when a trench in which he was working caved in on him. His son and another workman dug him out, but too late.

Springfield, Mass.—The George H. McLean Co., whose bid of $9,700 was the lowest, has been awarded the contract for the heating equipment of Springfield's new central heating plant.

Taunton, Mass.—The Flint-Nevitt Co. is the name of a new plumbing and steam-fitting firm which has opened an establishment in Boylen's block on Bay street.

Boston, Mass.—The Walworth Manufacturing Co. has been awarded a $1,000,000 steam-heating contract by the government, at the Portsmouth Navy Yard. The contract was signed by Secretary of the Navy Meyer on April 22d.

Connecticut.

Manchester, Conn.—Ferris Bros. have been awarded the contract for plumbing the new school building at the Center.

East Hartford, Conn.—W. R. Walker, of Hartford, has opened a plumbing establishment in the Comstock building at 3 Orchard St.

Naugatuck, Conn.—George Wigglesworth has, among others, contracts for plumbing in James Murphy's house on Main street and William Andrews' house in Beacon Falls.

Middletown, Conn.—Fisk & Flynn have the contract for plumbing and heating for the new house which is to be erected at the corner of Park place and Liberty street for Nicholas Dalton. The house will be arranged for two families.

Darien, Conn.—Earl Stevens has awarded a contract for steam-heating in his residence to Hoyt & Jessup.

South Norwalk, Conn.—Jones & Hotchkiss, of Norwalk, have the contract for plumbing and heating a new house for George Cavanaugh. The house will be located on Main street and foundations are now being put in.

THE CHARM OF LIFE.

The charm of life, that which gives it zest and meaning, is to do useful work for our time, our place, and our generation; to give more than we receive; to place usefulness ahead of emolument; to push the world a little inch uphill, and to plant a flower in everybody's garden but our own.